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Epidemiologic Procedures as a Case-Finding Mechanism in Syphilis Control

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IT is the contention of this Division of Venereal Disease Control that the collection and analysis of statistical data are important initial steps which can subsequently guide program activities into the most effective channels of control. During the past two years special statistical studies have been developed with a specific purpose in view—to serve as a guide in the planning and directing of the various phases of the Division's activities. Case and contact informations have been studied for significant facts about the prevailing venereal disease problem in Ontario and about the individuals or groups of individuals with whom we are dealing.

An example of an application of statistical procedures in the form of a study carried out on notifications received, respecting venereal disease infections reported in this Province, during the period April 1 to September 30, 1947, was published in the November, 1947 issue of the Journal¹.

From the standpoint of syphilis control, the early communicable infections are of greatest significance. New syphilis arises from pre-existing infectious syphilis. The effectiveness of control measures will depend almost entirely upon the success which is attained in promptly locating infectious early syphilis and rendering such infection non-communicable by adequate treatment. Infectious syphilis continues to be prevalent in our population not only because early cases are not always adequately treated when located but also because there are still a significant number of infections which are not located, at least not during the infectious stage. The former reason should be

¹Brown, W. G., and Nichols, W. B.: Statistical Studies in Venereal Disease Control. *Canad. J. Pub. Health*, 1947, 38: 528.

decreasing in importance in view of greater public and physician co-operation and the availability of more convenient and efficient methods of treatment. The latter reason is still by far the major cause of failure in attainment of effective control.

PURPOSE OF STUDY

The purpose of this study is to evaluate the efficiency of the several procedures comprising epidemiologic investigations and to determine their combined contribution to case finding. In the evaluation of each procedure special consideration was given to certain factors since it was felt that observations respecting these factors might reveal inadequacies in the epidemiologic techniques employed.

Evaluation is based upon data respecting completed investigations of individuals who were stated to have been exposed to known cases of primary or secondary syphilis. It is appreciated that these data consist of information provided by the case respecting the contact and therefore some degree of inaccuracy regarding age, marital status, et cetera, of contacts may exist. The significant statistical criterion (index) is the number of individuals, located by epidemiologic procedures and diagnosed as new cases of primary or secondary syphilis, during the period July 1st to December 31st, expressed as a percentage of the total cases of primary or secondary syphilis registered during this period, irrespective of whether these registered cases gave contact information or not.

METHOD OF STUDY

The epidemiologic procedures of case interviewing and contact investigation will locate a significant number of previously unknown communicable syphilis infections and it is believed therefore that these procedures will have an increasingly important role to play in syphilis control. An interim assessment of the current efficiency of epidemiologic procedures, in this Province, is possible since a punch-card analysis of contact data has been maintained by this Division. During the period July 1 to December 31, 1947, a total of 3,468 contact informations* was received and a statistical evaluation has been made of the epidemiologic procedures which were applied to the cases and contacts of infectious syphilis (primary or secondary) completely investigated during this six-month period.

It is obvious that a certain amount of time is necessary to complete epidemiologic investigations. In this study contact investigations were not considered closed until 90 days after the contact information had been collected, unless the information collected was inadequate, irrelevant, or completely investigated within the ninety days. However, of the contact informations received during November and December, only those which had been completely investigated as at January 15, 1948, have been included in this study. This will account for the fact that 81 contact informations pertaining to the above-mentioned months are not included in the analyses.

*Respecting syphilis and gonorrhoea.

Since several contact informations may be received about the same individual, the data available for study represent fewer persons than indicated by the number of contact informations. For analytical purposes, therefore, an attempt should be made to convert contact informations to an individual basis. Where the contact information was adequate this was relatively easy to do and the following table has been compiled as an illustration of the steps involved.

TABLE I

CONVERSION OF ADEQUATE CONTACT INFORMATIONS RESPECTING PRIMARY OR SECONDARY SYPHILIS TO AN INDIVIDUAL BASIS (CONTACTS)

	MALE CONTACTS	FEMALE CONTACTS
1. Contact informations provided by cases of primary or secondary syphilis.....	276*	379†
2. Total contact informations completely investigated.....	237	337
3. Adequate contact informations completely investigated..	210	263
4. Individuals (contacts)‡ related to (3).....	130	139

*There were 220 female cases of primary or secondary syphilis reported—a ratio of 1.26 contact informations per reported case.

†There were 415 male cases of primary or secondary syphilis reported—a ratio of 0.91 contact informations per reported case.

‡Hereafter designated simply as 'contacts'.

INTERVIEWING OF THE CASE

The Factor of Sex

Of a total of 635 cases of primary or secondary syphilis reported, 343, or 54.01 per cent, provided contact information. The ratio of contact informations per case reported (1.26 for female cases and 0.91 for male cases) is calculated on the basis of all cases reported whether contact information was provided or not. It will be seen that female cases of primary or secondary syphilis provided almost 40 per cent more contact informations per case than did male cases of primary or secondary syphilis.

A study of Table I reveals that 88.6 per cent of the male contact informations obtained from female cases of primary or secondary syphilis were considered adequate for contact location, whereas 78.0 per cent of the female contact informations obtained from male cases were considered adequate for contact location.

The ratio of adequate contact informations to contacts, which is 1.9:1 for females and 1.6:1 for males, is readily obtainable from Table I. From these comparative ratios it may be seen that the adequate contact informations regarding females related to proportionately fewer persons than did the adequate contact informations regarding males. From the statistic of one female being named twice, on the average, it should not be inferred that all females who have been named only once actually should have been named twice within the period of the study. Many factors have a marked influence upon this ratio of contact informations to contact. If the additional factor of marital status is considered, it will be found that this ratio is greatly influenced by the conjugal condition of the female contact.

The Factor of Marital Status

In this and other studies it was revealed that over 75 per cent of the married female contacts were marital partners of the case interviewed and that practically all of this 75 per cent appeared only once in contact information. On the other hand, the ratio of contact informations to contacts, for unmarried females, revealed the fact that the majority of unmarried females were named at least twice in contact information received during the period under study. The general ratio of contact informations to contacts, among females, is altered by the factor of marital status. The ratio of 1.9:1 becomes 1.1:1 if the female contact is married and 2.2:1 otherwise. However, the general ratio of contact informations to contacts among males, 1.6:1, is not altered by the marital status of the male contact.

Observations

1. Female cases divulged more contact informations than did male cases.
2. The quality of information obtained from female cases was more adequate for contact follow-up.
3. The general ratio of contact informations to contacts, among females, was altered by the factor of marital status.

LOCATION OF THE CONTACT

The Factor of Sex

As might be expected, there was no significant sex difference in contact location when the contact information was considered adequate for epidemiologic follow-up. One hundred and six of the 130 male contacts (81.5 per cent) and 112 of the 139 female contacts (80.6 per cent) were located. However, if we include the investigations where the contact informations were not considered adequate for epidemiologic follow-up,* we find that these percentages become 70.2 for males and 54.4 for females. When these facts are considered together with the data of Table I, which brought to light the fact that female cases of early syphilis divulged proportionately more contact informations than did male cases and that the quality of the information from females was considered to be somewhat more adequate for epidemiologic follow-up, it seems obvious that success in locating contacts did not vary with the sex of the contact who was named, but rather varied with the sex of the case interviewed for contact information. In other words, the ultimate success of contact location has been greater when the case interviewed was a female.

The Factor of Marital Status

When the contact was the marital partner of the case interviewed, success in location, irrespective of sex, was found to be 93.2 per cent. This high percentage of successful location can be expected in view of the facility in locating wives or husbands of cases interviewed. When the contact was not

*The arbitrary conversion of inadequate contact informations to an individual basis was practically on a 1:1 basis since in the majority of instances it was impossible to connect two or more inadequate informations to more than one individual.

the marital partner of the case interviewed, success in location was considerably lower, namely 59.6 per cent.

It is believed that in any evaluation of marital status as a factor in success of location of contacts the data respecting location of marital partners of cases interviewed should be excluded. In these instances the mere fact that the case interviewed is married and is resident with his or her marital partner assures almost 100 per cent efficiency in location.

Among contacts who were not the marital partners of the cases interviewed, success in location was about 20 per cent higher when the contact was married. This is believed to be due chiefly to the fact that married contacts more frequently have a permanent place of residence.

Observations

1. There was no significant sex difference in contact location when the contact information was considered adequate for epidemiologic follow-up.
2. The ultimate success of contact location has been greater when the case interviewed was a female.
3. When the contact was the marital partner of the case interviewed, success in location, irrespective of sex, was almost 100 per cent.
4. Among contacts who were not the marital partner of the case interviewed, success of location was about 20 per cent higher when the contact was married.

LOCATION OF SYPHILIS

The following table gives the percentage distribution, by sex, of the results of examination among located contacts. When the contacts of primary or secondary syphilis were found to be infected, in 95 per cent of the instances the infection was in the primary or secondary stage.

TABLE II
LOCATION OF SYPHILIS—BY SEX
(Percentage Distribution)

EXAMINATION OF LOCATED CONTACTS	MALE CONTACTS	FEMALE CONTACTS
Syphilis—not under medical care.....	29.6	40.4
Syphilis—under medical care.....	29.6	27.5
Negative for Syphilis.....	40.8	32.1
TOTAL.....	100.0	100.0

The Factor of Sex

The ratio of contact informations to contacts among the persons referred to in Table II is estimated to be 1.9:1 for females and 1.6:1 for males*. The percentage of located individuals found infected was 67.9 for females and 59.2 for males (Table II). These percentages are in a ratio of 1.8 + to 1.6, which is as expected since the probability of infection should vary with the frequency of exposure to communicable syphilis.

*Although the data of Table II relate to individuals who were located and examined, this group comprises 80 per cent of the individuals who were the basis of this ratio.

As has been already stated, contact investigations were not considered closed until ninety days had elapsed. Such a period of time was deemed necessary before contacts could be considered not infected. Table III gives the cumulative percentage breakdown, in two-week periods, of the time required for complete investigation when new infections, not already under medical care, were located.

TABLE III
LOCATION OF NEW INFECTIONS—RELATED TO REQUIRED TIME OF INVESTIGATION
(Cumulative Percentage Distribution)

REQUIRED TIME OF INVESTIGATION	MALE	FEMALE
Under 2 weeks.....	64.3	40.4
Under 4 weeks.....	89.3	71.4
Under 6 weeks.....	92.9	78.5
Under 8 weeks.....	96.4	88.1
Under 10 weeks.....	100.0	95.2
Under 12 weeks.....	100.0	97.6
Over 12 weeks.....	100.0	100.0

The data in Table III are in accord with the statement of Moore², and other authorities, that the determining of a diagnosis will require a longer period of investigation in female contacts than in male contacts. This statement is based on the fact that the early lesions of syphilis are often not seen in the female and consequently the earliest diagnosis, sero-negative primary syphilis, is made less frequently.

The Factor of Marital Status

According to the data analysed in this study, marital status alone was not found to have any appreciable influence on the probability of acquisition of infection among the persons who were exposed to communicable syphilis.

The Factor of Age

An enquiring statistical approach is often invaluable in that it assists in sifting out individual groups, which may require special attention, by showing that their contribution to the problem under consideration is significantly out of proportion to their numerical representation. The age-group distribution of contacts, who were found infected, is included in this presentation since it suggests that age of contact may be of some significance in epidemiologic investigations.

TABLE IV
LOCATION OF INFECTIONS—RELATED TO AGE GROUP
(Percentage found Positive)

AGE GROUP	PERCENTAGE INFECTED	
	MALE CONTACTS	FEMALE CONTACTS
Under 24.....	51.1	70.4
25-29.....	55.6	68.8
30-34.....	71.4	50.0
35-39.....	75.0	50.0
Over 40.....	66.7	87.5
All ages†.....	59.2	67.9

†Including those whose age was not stated.

²Moore, J. E., et al.: *The Modern Treatment of Syphilis*. Springfield, Ill.: Charles C. Thomas, 1944.

The above data indicate that the age of the contact may have some bearing upon the probability of acquisition of infection, especially in the older age groups.

Observations

1. The probability of infection varied directly with the frequency of exposure to communicable syphilis, irrespective of sex.
2. The determining of a diagnosis required a longer period of investigation in female contacts than in male contacts.

EVALUATION

When contacts are located and found infected, a certain number are found to be already under medical care for their infection. The measure of the efficiency of combined epidemiologic procedures is the number of located contacts who were diagnosed as new cases of primary or secondary syphilis, not under medical care when located, expressed as a percentage of the total number of primary and secondary infections registered during the period under study.

It should be repeated at this time that the contact informations received in November and December, 1947, were held open until January 15, 1948. Consequently a few of the November or December contacts found infected with primary or secondary syphilis during the period January 1 to 15, 1948, were not already under treatment and therefore were not registered as new cases of primary or secondary syphilis during the period under study. In arriving at the final epidemiologic index this fact has been taken into consideration (Table V).

TABLE V
EVALUATION OF EPIDEMIOLOGIC PROCEDURES AS A CASE-FINDING MECHANISM
FOR PRIMARY OR SECONDARY SYPHILIS
July 1 to December 31, 1947

A—Cases of primary or secondary syphilis reported.....	635
AA—Cases of reported primary or secondary syphilis which gave contact information.....	343
B—Contacts named by AA who were found infected with primary or secondary syphilis.....	125
BB—Contacts named by AA who were found infected with primary or secondary syphilis and were not already under treatment when located.	69
C—Percentage that BB is of A.....	10.9

It would appear that 11 per cent of the cases of primary or secondary syphilis, registered during the period July 1 to December 31, 1947, were brought under diagnosis through epidemiologic procedures. An additional 9 per cent of primary or secondary infections were also located through epidemiologic procedures but were already under treatment when located. Therefore, on the basis of this study, it would appear that in the Province of Ontario epidemiologic procedures have a significant role to play as a means of bringing under diagnosis previously unknown cases of early syphilis.

Unfortunately, it is difficult to compare these findings with other studies, for a variety of reasons. Similar studies, conducted by other jurisdictions,

vary widely in their purpose, their means of procedure and their methods of evaluation. Because of this lack of uniformity, comparisons cannot and should not be attempted.

In Canada the adoption of a National Form for the notification of venereal disease infections, and for the collection of contact information, offers a uniform basis for the compiling of statistical data regarding cases and contacts, and it should be possible therefore to establish a uniform basis for the assessment of reported venereal disease incidence. It is furthermore desirable that a uniform basis be adopted for the assessment of control procedures, in order that the contribution of new techniques may be readily evaluated for more general adoption.

This might be implemented through uniform evaluation indices for the assessment of the individual steps generally followed in epidemiologic investigations. The adoption, at least, of a uniform overall evaluation ratio, similar to that illustrated in Table V, should be certainly possible and is highly desirable.

COMMENTS

1. The procedures which are followed in the epidemiologic investigations of venereal disease infections are essentially the same as those which might be followed in the investigation of other communicable diseases. However, the techniques used in these procedures must be specifically designed to suit the peculiarities which are characteristic of venereal disease investigations.

2. In the evaluation of the combined procedures of contact investigation, their contribution to venereal disease control can best be measured by the percentage of previously unknown syphilis which is brought under control by such procedures alone. Epidemiologic investigations of primary or secondary syphilis should be selected for evaluation in order to avoid the inaccuracies of probable duration of infection which are characteristic of latent and late syphilis.

3. All cases diagnosed are not interviewed. When interviewed they do not always give contact information. This basic handicap must be accepted as an inefficiency of the primary epidemiologic procedure of interviewing. For this reason the denominator of the evaluation ratio should be the total number of cases of primary or secondary syphilis reported, irrespective of interviewing. All contacts located and found infected cannot be credited to the procedures of epidemiologic investigation. Only those contacts located and found to be infected with primary or secondary syphilis, and not already under medical care, should be included in the numerator of the evaluation ratio. A ratio established on this basis will not perhaps appear impressive but it will at least provide the most accurate evaluation of combined epidemiologic procedures.

Having determined the evaluation ratio, a review of the basic data can then be made with a view to improving epidemiologic techniques. Of greatest interest will be the data regarding unsuccessful investigations since in these data we may expect to find the significant reasons for failure. If effective improvements in techniques can be made, a rise in the evaluation ratio should result.

The Immunizing Efficiency of Diphtheria Toxoid when Combined with Various Antigens

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IN a preliminary report (1) based upon experiments with guinea pigs it was found that the addition of pertussis vaccine to diphtheria toxoid enhanced the immunizing power of the latter. Quantitative determinations demonstrated that as the numbers of pertussis organisms were increased the immunizing efficiency of the diphtheria toxoid was also increased, and that the concentration of pertussis organisms usually found in commercial preparations increased the immunizing efficiency of the toxoid at least two-fold.

Further studies dealing with the immunizing efficiency of diphtheria toxoid have been carried out with the following combinations of materials: (a) diphtheria toxoid combined with tetanus toxoid, (b) diphtheria toxoid combined with tetanus toxoid and pertussis vaccine, (c) diphtheria toxoid combined with typhoid, paratyphoid A, and paratyphoid B (T.A.B.) vaccine, and (d) diphtheria toxoid combined with scarlet fever toxin and pertussis vaccine.

EXPERIMENTAL PROCEDURE

The diphtheria toxoid employed was a fluid toxoid concentrated by ultra-filtration to contain 500 Lf's per c.c. The pertussis vaccine was a concentrated preparation containing eleven hundred billion (1100×10^9) organisms per c.c. The remaining antigens were the usual commercial products as prepared by the Connaught Medical Research Laboratories of the University of Toronto.

The mixtures were prepared at time of use and were designed to contain a constant amount of diphtheria toxoid (approximately 16 Lf's per c.c.). The other materials were added, so that they would be present in the concentration normally found in commercial preparations. This was achieved by preparing the mixture in the manner shown in Table I.

Two experiments were performed, the first with male, and the second with female guinea pigs. The experimental animals were from a closed stock and of about the same weight (280-330 grams).

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TABLE I
PREPARATION OF THE COMBINED ANTIGENS

Preparation	Vol. of diphtheria toxoid* c.c.	Other antigens**		Saline c.c.	Final volume c.c.
		Type	Volume c.c.		
A. diphtheria toxoid (control)	1.0	0	0	30	31.0
B. diphtheria toxoid combined with tetanus toxoid	1.0	tetanus toxoid	29	1	31.0
C. diphtheria toxoid combined with tetanus toxoid and pertussis vaccine	1.0	tetanus toxoid	29	0	31.0
		pertussis vaccine	1		
D. diphtheria toxoid combined with T.A.B. vaccine	1.0	T.A.B. vaccine	30	0	31.0
E. diphtheria toxoid combined with scarlet fever toxin and pertussis vaccine	1.0	scarlet fever toxin	3	26	31.0
		pertussis vaccine	1		

*The diphtheria toxoid was concentrated fluid toxoid containing 500 Lf's per c.c. The amount added to the mixtures resulted in all preparations having approximately 16 Lf's per c.c.

**The pertussis vaccine was a concentrated preparation containing 1100×10^9 organisms per c.c.; the scarlet fever toxin contained 10,000 skin test doses per c.c.; the tetanus toxoid and T.A.B. vaccine were the usual commercial preparations.

Two hundred and seventy guinea pigs were used in the first experiment recorded in Table II. The guinea pigs were divided equally between the preparations under study so that there were 54 animals for each of the four preparations and the control. Each group of 54 was divided into three subgroups of 18 animals.

The animals were inoculated subcutaneously. In the case of the diphtheria toxoid (control) and the diphtheria toxoid combined with tetanus toxoid the first subgroups received 1.0 c.c. of undiluted toxoid, the second subgroups received 1.0 c.c. of a 1:2 dilution, and the third subgroups received 1.0 c.c. of a 1:4 dilution. For the remaining preparations the first subgroups received 1.0 c.c. of a 1:2 dilution, the second subgroups received 1.0 c.c. of a 1:4 dilution, and the third subgroups received 1.0 c.c. of a 1:8 dilution of diphtheria toxoid. This had the effect of providing 16, 8, and 4 Lf's diphtheria toxoid respectively to the subgroups of the first two preparations, and 8, 4, and 2 Lf's to the subgroups of the latter three preparations.

On the nineteenth day after the inoculation an area of at least 50 square centimeters was clipped on the back of each animal, and each animal was

TABLE II
IMMUNIZATION WITH DIPHTHERIA TOXOID ALONE AND IN COMBINATION
WITH OTHER ANTIGENS

First Experiment

Preparation	Dilution *	Number of guinea pigs	Results		Efficiency compared to the control**
			Number Schick negative	Percentage Schick negative	
A. diphtheria toxoid (control)	undiluted	18	8	44	—
	1:2	18	6	33	—
	1:4	17	2	12	—
B. diphtheria toxoid combined with tetanus toxoid	undiluted	17	11	65	159% (limits 80-318)
	1:2	18	7	41	
	1:4	18	4	22	
C. diphtheria toxoid combined with tetanus toxoid and pertussis vaccine	1:2	18	17	94	915% (limits 378-2213)
	1:4	18	15	83	
	1:8	18	9	50	
D. diphtheria toxoid combined with T.A.B. vaccine	1:2	18	14	78	384% (limits 206-715)
	1:4	18	9	50	
	1:8	18	4	22	
E. diphtheria toxoid combined with scarlet fever toxin and pertussis vaccine	1:2	17	15	88	522% (limits 290-1940)
	1:4	18	15	83	
	1:8	18	3	17	

*All the dilutions were administered subcutaneously in a dose of 1.0 c.c.

**Calculated by the method of Bliss (2). The limits refer to the limits of error for $P = .05$. This means that if the test were repeated 100 times the results would fall within these figures 95 times.

Schick tested with ten minimal skin reacting doses (M.R.D.) of a stable diphtheria toxin, contained in 0.1 c.c. As controls, at the time the animals were Schick tested, five normal guinea pigs were inoculated intradermally with one-tenth of the challenging dose or 1 M.R.D. and all showed an area of redness and swelling at least 6 mm. in diameter. In reading the results on the test animals an area of redness and swelling of 6 mm. or greater was considered to be a Schick positive test.

The results of the experiment are shown in Table II. It is there shown that in no instance was the immunizing efficiency of the diphtheria toxoid depressed. When the results were statistically analyzed it was found that, compared to the diphtheria toxoid control, diphtheria toxoid combined with tetanus toxoid was 159 per cent more effective; diphtheria toxoid combined with tetanus toxoid and pertussis vaccine was 915 per cent more effective; diphtheria toxoid combined with T.A.B. vaccine was 384 per cent more effective;

TABLE III
IMMUNIZATION WITH DIPHTHERIA TOXOID ALONE AND IN COMBINATION
WITH OTHER ANTIGENS

Second Experiment

Preparation	Dilution*	Number of guinea pigs	Results		Efficiency compared to the control**
			Number Schick negative	Percentage Schick negative	
A. diphtheria toxoid (control)	undiluted	17	9	53	—
	1:2	18	5	28	
	1:4	18	2	11	
B. diphtheria toxoid combined with tetanus toxoid	undiluted	18	10	56	117% (67-206)
	1:2	18	7	39	
	1:4	17	2	11	
C. diphtheria toxoid combined with tetanus toxoid and pertussis vaccine	1:2	18	17	94	604% (331-1120)
	1:4	18	14	82	
	1:8	18	7	39	
D. diphtheria toxoid combined with T.A.B. vaccine	1:2	18	14	82	433% (246-761)
	1:4	18	13	76	
	1:8	18	4	22	
E. diphtheria toxoid combined with scarlet fever toxin and pertussis vaccine	1:2	18	17	82	680% (385-1200)
	1:4	18	17	82	
	1:8	17	6	35	

* See footnotes for Table II.

and diphtheria toxoid combined with scarlet fever toxin and pertussis vaccine was 522 per cent more effective.

To confirm these findings a second experiment involving 270 female guinea pigs with similar weights, and from the same colony, as the animals of the first experiment was undertaken. The experimental procedure was identical to that described for the first experiment, and the results are presented in Table III. Here, too, enhancement of the immunizing efficiency of diphtheria toxoid was shown for all combinations on test. Statistical analysis showed that these results agree reasonably well with those of the first experiment. For example, when compared to the control and with the earlier corresponding result shown in brackets, diphtheria toxoid combined with tetanus toxoid was 117 per cent more effective (159 per cent); diphtheria toxoid combined with tetanus toxoid and pertussis vaccine was 604 per cent more effective (915 per cent); diphtheria toxoid combined with T.A.B. vaccine was 433 per

cent more effective (384 per cent); and diphtheria toxoid combined with scarlet fever toxin and pertussis vaccine was 680 per cent more effective (522 per cent).

DISCUSSION

The evidence presented indicates that, so far as can be judged by guinea pig experiments, combining diphtheria toxoid with other antigens enhances the immunizing efficiency of the diphtheria toxoid. In a previous experiment it was shown that the concentration of pertussis organisms usually found in commercial preparations at least doubled the immunizing efficiency of the diphtheria toxoid. The present experiments have shown that when a third antigen such as tetanus toxoid or scarlet fever toxin is added to this combination, the immunizing efficiency of the diphtheria toxoid is increased five to ten fold.

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The Public Health Nurse in the Rural Health Program

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WHEN I was asked to prepare a paper for this meeting it was suggested that I stress the *teaching* of health in a community, not merely service. To my mind the best way to teach is through service, but of course that does not always mean "bedside nursing service".

I should like to tell you briefly what we in New Brunswick are attempting to do in a generalized nursing service without bedside nursing. Our service is predominantly rural and we have a mere handful of nurses, not because we do not want more, but because we cannot get more.

New Brunswick covers an area of approximately 28,000 square miles and today has an estimated population of 480,000 people. Approximately 137,000 people in our three cities and several small towns are receiving community nursing service from the Victorian Order of Nurses, with two cities also having specialized school and tuberculosis services under other lay organizations. Where community nursing service is available through lay organizations, the Provincial Public Health Nurses co-operate in every possible way, particularly in immunization clinics and the like. In New Brunswick the Victorian Order are subsidized by the Department of Health for work in schools and child hygiene.

For the remaining 343,000 people, we have eleven public health nurses and one director. Each nurse is trying to serve from 20,000 to 50,000 people, a far cry from the 5,000 per nurse recommended by those who study this question. We are not organized under the county unit plan. Our aim thus far has been to try to get at least one nurse in each county (there are 15 counties) and even in this we have not yet succeeded. This does make for uneven distribution of population, but some of our counties cover larger areas where the population is not so great. In at least five counties it is necessary to have bilingual nurses. The main highways are good, but as much cannot be said for many of those leading to back settlements. To know the type of road and road conditions is a most essential part of the public health nurse's general information.

Our welfare workers are few, consequently the nurse finds herself continually involved in social problems, which because of their very nature cannot be disregarded. It would seem that a lot of people, particularly in rural areas, feel that the nurse should be able to do practically anything, from obtaining the mother's allowance or old age pension for them, to securing a house.

Presented before the Public Health Nursing Section at the thirty-fifth annual meeting of the Canadian Public Health Association, held in the Château Frontenac, Quebec, May 20-22, 1947.

Naturally, with such large areas to cover and so few nurses, it is impossible to visit many mothers in their homes for infant and pre-school instruction, so we are attempting to build up community conferences where mothers may come to talk things over with the nurse and to bring their babies and pre-school children for the nurse's inspection and for immunization. We endeavor to get an interested group in the community to sponsor such a project and to be responsible for a place of meeting, heating, cleaning, etc., and gradually to furnish the necessities for such an undertaking, also for volunteer help.

We want the people to feel that the whole undertaking is really theirs and that the nurse comes in the capacity of adviser. All private physicians in the area are contacted before starting such a conference, to get their blessing, so to speak. (I should like to say here that *all* private physicians have not reacted favorably, and in that case we do not pursue the project. Whether they are not interested in public health matters or whether they feel that this type of thing might affect them in a financial way, it is difficult to say. I think in most cases it is a lack of understanding. Later on, the doctor sometime changes his mind.)

We hope also at these conferences to have demonstrations and talks for expectant mothers; in short, to make them a place where mothers feel free to come for instruction and help.

Usually, of course, where the need is greatest, facilities are the poorest and meeting places are the greatest problem. Occasionally there is a suitable hall, but the place of meeting is more apt to be the one-room school house, or even a private home. School houses are far from ideal and there are school hours to be considered, but then one does not start with the ideal.

The conferences are held once a month during the late spring, summer and fall, much depending on the condition of the roads. A few are held throughout the winter if train services are available. Where conferences are large, the nurses in adjoining counties try to plan to help one another. While the nurse is in the community she may also plan for a brief visit to the school and a conference with the school teacher.

The mention of school brings us to the question of school nursing and the type of nursing we can expect where each nurse has from 100 to 175 schools in her area, quite a different set-up from that of a city where the public health nurse has probably had her field work while at a university or where she has worked before coming to us.

Not the least of our problems in the school health program is that of trying to convince county superintendents and teachers that the work of the school nurse is not to look for and exclude those pupils who may have lousy heads, scabies or impetigo. I think that we as public health nurses are probably partly responsible for this attitude on the part of school officials, because in the past this has been a major problem and we undertook to deal with it alone.

Individual inspection of pupils at various intervals is not the answer for us to the school nursing problem, even if we were able to do it, which we are not, for it is not possible for the nurse to visit each school even once a year.

We have to recognize the fact that the teacher is *the* person in the school to put a health program into effect, with as much help as possible from the nurse, and that if we are to make health a practical living experience and not just another subject to pass an examination on at the end of the year, the program must be a co-operative one between parents, teachers and health officials. We are endeavoring to get across to teachers, first at Normal School, then at group meetings of teachers and also by individual conferences, that the whole child must be the teacher's concern and that through day-by-day contact with the pupils and careful observation, which opportunity the nurse does not have, they are the ones who will notice whether Susie squints badly, Johnny tires easily, Mary has continual colds or Kate appears sullen and does not participate in play with the others, also early signs of illness; and that if the nurse is not readily available, a visit to the home by the teacher may be of definite help, or, in case of illness, exclusion from school. In every possible way, of course, we are trying to convince parents that if a child shows signs of illness he should not be in school. Problems of sanitation, from the water supply to the outdoor privy, must be the concern of the teacher, with the help always of the health officials.

Do not think from what I have said that we have given up entirely the work of individual inspection of pupils, for it is one thing to think that something should be changed and another to put the change into effect. We know that change has to be gradual, for you do not, all of a sudden, convince teachers that this health business is their concern, particularly since for many years the only type of school health work done in New Brunswick, exclusive of vaccinations and periodic inoculation clinics, was the medical health officer's brief inspection (sometimes so brief that 25 or 30 pupils were inspected in as many minutes). When the nurse does visit the school, we feel that the greater part of the time should be spent with the teacher. We are encouraging the teacher to keep an informal report on each pupil's health, for her own information and for the nurse when she visits the school, and to refer what she may consider urgent cases to the nurse by letter, so that the nurse will try to visit that school and the parents of the pupils as soon as possible. Are we getting results? A long, long way from 100 per cent yet, but we have a large enough percentage of teachers co-operating to make us feel that we are pursuing the right course; in fact, the only course that we can pursue if we are to get anywhere with school health.

Along with what we are trying to do in the schools during the year, the nurses hold many immunization clinics where children are inoculated against diphtheria and whooping cough.

We have a Department of Nutrition headed by a medical director and with one full-time nutritionist. This division has been in existence less than two years.

Since the director of this division knows, and we know, that any nutrition program cannot be divorced from the whole health program, she and the nutritionist work very closely with the nurses, particularly in their monthly conferences, and with the nurse and teachers in the schools. The director endeavors to visit the conferences each year for physical examination of infants. The nutritionist can often manage a demonstration for the mothers—i.e., serving of whole-grain cereals. In the schools the emphasis is being put on the school lunch, whether it be hot or cold.

We have a high incidence of tuberculosis in New Brunswick. When a new sanatorium of 200 beds, recently opened, is admitting patients at full capacity, we shall have the required number of beds estimated to care for our tuberculosis patients, but this does not mean that we shall have, for some time yet, enough beds to accommodate them all—our waiting lists have been too long. The usual type of nursing is being carried on in this field: finding the source of the disease, getting contacts in for examination, trying to persuade people to go for examination and then again trying to persuade others to go to sanatoria; teaching patients who must be treated at home, at least for a time, how to protect others and someone in the home how to care for them; assisting at clinics, whether they be weekly, monthly or held in connection with school surveys, patch-testing, etc.

Our venereal disease follow-up is another number one problem which we are trying to do something about. If we could only dismiss it as easily as one recent contact tried to do when, on being informed by letter that he must have an examination, he replied: "Do not bother me with such things, I have not time to attend to them."

Each nurse plans her own program to a very large extent, concentrating on that phase of the work which seems most urgent in her particular area, be it schools, tuberculosis or infant and child hygiene, working of course under the direction of the district medical officer of health.

Sometimes it is necessary for the nurse to leave her headquarters very early in the morning, possibly 7.30, if she has an immunization clinic planned for 9 o'clock and has to drive sixty or seventy miles to reach the community; and she may not get back until long after supper. In the winter she may have to take an early train or bus in order to attend a monthly conference, with no way of getting back until a late train in the evening. Evening meetings are often necessary, when the nurse may be asked to speak at a Home and School Association meeting, a Women's Institute meeting or that of some other interested group. If attending District Women's Institute Conventions during the summer months, the nurse of course will be asked to stay and enjoy the picnic supper. During this social period she has an excellent opportunity to talk to the members individually and to answer their questions. This is good business and certainly may all be included in the day's work.

Naturally we do not encourage too many of these long days and evening meetings, but the nurses in planning their program find that it is necessary and their time off duty can be planned accordingly.

It is necessary to have the closest co-operation with all those people who like ourselves are trying to do something in the way of prevention of disease and the promotion of health—the Director of Junior Red Cross, the physiotherapist at the polio clinic, service clubs, and other departments of government, particularly the departments of Agriculture and Education.

Possibly the nurse can arrange to have the representative from the Agricultural Department attend a meeting and explain in simple terms about gardens and how a very small plot of land may be cultivated to produce a vegetable garden. Many people, even in rural sections, do not have gardens, and it is difficult to talk about good nutrition without mentioning green vegetables; and often the small store in the country does not carry a supply of green vegetables even in summer. They may be obtained from a can, but they are expensive.

One cannot make much headway in convincing teachers of the worthwhileness of a practical health program if the Department of Education officials are only lukewarm in their attitude.

Conferences are held each spring and fall when the nurses get together to discuss their problems and to bring to each other new and better ways of doing things which they have found helpful. Sometimes outside speakers are brought in, but just getting together with the other nurses, away from her district for a few days, provides stimulus for the nurse working alone.

The director tries to visit the nurses in their district about every two months, but even this is not always possible and much help has to be given by phone and letter.

We, in New Brunswick, realize that we are only scratching the surface in the program which we are attempting to carry, but it does seem impossible to embark on a community health program and leave out any one part of it; one cannot concentrate on the school child and neglect the pre-school, for the pre-school is the school child of tomorrow; we cannot look after the infant and neglect the mother, and so on.

The New Brunswick Department of Health has very definite plans for expanding its program, but until qualified personnel can be obtained for this larger set-up, we are far from discouraged with what we have been able to accomplish.

It may readily be seen from what I have said, how very important it is that the public health nurse, particularly she who works alone in a rural community, have an abundance of common sense, a very definite sense of responsibility, initiative and good judgment, a sense of humor, good physical health and emotional stability, the ability to get along with all types of people and to make every effort to understand their different ways of thinking and of doing things, and the ability to impart knowledge in a simple manner, so that it is understandable to the person to whom it is being given.

How many times have we heard it said: "she is a good nurse, but—" and the "but" usually refers not to a lack of theoretical knowledge or of nursing techniques, but to a lack of some of the things which I have just mentioned.

In an article in the *Mental Hygiene* pamphlet "Understanding the Child" a few months ago, reference was made to teachers who are over-educated in subject matter, but poorly trained in human relations. I am wondering if that could not be applied to nurses as well. Perhaps we do not have many who are over-educated in subject matter, but certainly we do have many who are poorly trained in "human relations."

In conclusion, I should like to emphasize a statement made by Miss Elizabeth Russell of Manitoba, in her paper on "The Preparation of the Public Health Nurse for service in Rural Health Units", given last year at the meeting of the Canadian Public Health Association. It was: "It would seem essential that the preparation of the public health nurse must begin in the undergraduate course. The School of Nursing can develop attitudes toward present health practice and towards progressive change. Here, the first effort must be made to prepare the right type of worker for the public health field."

Should not every nurse upon graduation have at least a general understanding of how to meet family and community problems and be able not only to nurse the sick but also to "teach" health?

The Ascorbic Acid Contents of Foods Served in H.M.C. Ships and Establishments*

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THE disease of scurvy is an ancient enemy of seafaring men and has caused much suffering at certain periods in the history of Naval Services. Although scurvy is not a problem in the Royal Canadian Navy, due to the nutritional and general living conditions provided, it was of some importance to find if the personnel were receiving enough ascorbic acid to permit of the attainment of maximum health. The results of the present investigations provide a partial answer to this question and may be correlated with a study of the general nutritional status of the personnel carried out by Watt (1). Facilities were provided by the Naval authorities for the study of diets in H.M.C. Ships in harbour, in H.M.C. Ships at sea and in H.M.C. shore establishments.

METHODS

The ascorbic acid contents of the foods as served in the mess-decks were determined so that the nutrient values relate to the foods as actually consumed by the personnel. Average representative servings were collected and analysed separately and the contribution of each food served to the total ascorbic acid content of the diet was found. The foods as supplied to one man were collected for 24-hour periods and the ascorbic acid (not including dehydroascorbic acid) was determined by an adaptation of the method of Jackson, as described by Branion, Roberts, Cameron and McCready (2).

RESULTS

Ships in Harbour

The study of the diets in H.M.C. Ships of the Newfoundland Escort Force in harbour was so arranged that the Service operations were not interfered with. Under these conditions it was convenient to obtain samples of food as served for one day in each ship and to obtain a sufficiently large number of samples to make the results representative. Samples were obtained from 24 ships, and, since the collection from one was duplicated, for a total of 25 days during August to October 1944.

The ascorbic acid in the daily diet in 6 frigates ranged from 42 to 124 mg. (average 78 mg.), in 15 corvettes the range was from 8 to 140 mg. (average

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83 mg.), and in 1 minesweeper 59 mg. were found; the average of all these ships' diets being 81 mg. There was no significant difference, as far as could be told, in the values from one type of ship to another, nor were differences to be expected, since the ships were all on "general messing" under the same Scale of Rations.

The contribution of each food served to the total ascorbic acid content of the diet was found (Table I). The average ascorbic acid contents of the

TABLE I
ASCORBIC ACID CONTENTS OF THE FOODS AS SERVED IN H.M.C. SHIPS IN HARBOUR
FOR A TOTAL OF 25 DAYS IN 24 SHIPS

Foodstuff	How prepared	Number of times served	Average weight of serving mg.	Average ascorbic acid content of serving mg.	Ascorbic acid content of food as served per 100 grams mg.
Oranges	Fresh	6	144	58	40
Grapefruit	Fresh	8	115	49	42
Grapefruit	Juice	2	140	44	31
Apple	Juice (fortified)	2	113	27	24
Tomatoes	Fresh	3	142	22	15
Tomato	Juice	3	116	12	10
		27			
Cabbage	Boiled	6	134	8.1	6.0
Carrots	Boiled	4	115	3.0	2.6
Peas	Canned	4	83	3.1	3.7
Corn	Canned	6	129	1.1	0.9
Beans	Canned (various types)	7	128	3.5	2.7
Celery	Fresh	3	46	1.1	2.4
Lettuce	Fresh	1	173	1.1	0.7
Cucumber		1	103	6.0	5.8
Sauerkraut	Canned	3	90	10.2	11.3
Mixed vegetables		2	144	5.4	3.7
		37			
Potatoes	Boiled	22	152	16.8	11.1
Potatoes	Mashed	5	113	17.0	15.0
Potatoes	Scalloped & Creamed	4	177	10.7	6.1
Potatoes	Roasted & Baked	5	120	12.1	10.0
Potatoes	Fried	2	78	6.6	8.6
Turnips	Boiled	4	73	6.4	8.8
Parsnips	Boiled	2	83	3.9	4.7
Cauliflower	Boiled	1	35	1.1	3.4
Apples	Fresh	1	132	2.0	1.5
Peaches	Canned	3	154	4.5	2.9
Pears	Canned	1	160	2.5	1.6
Cantaloupe	Fresh	1	127	10.7	8.4
Apricots	Canned	2	81	1.7	2.1
Prunes	Stewed	5	125	3.1	2.5
		58			
Soups	Various kinds	15	191	4.6	2.4
Pie filling	Various	5	100	0.5	0.5
Liver		3	88	4.7	5.3
Milk		3	215	0.1	0.05
Irish stew, Beef heart, Macaroni and Cheese, Custard, Baked Beans, Eggs.			Ascorbic acid absent or present in negligible amounts		

servings of fresh citrus fruits and their juices, tomatoes and tomato juice and fortified apple juice were higher than in any other food group, varying from 58 mg. in fresh oranges to 12 mg. in tomato juice servings. The ascorbic acid contents per 100 grams of food were also highest in this food group.

Leafy, green and yellow vegetables, when fresh and in good condition, are rich sources of ascorbic acid (Bowes and Church, 4) but as served in the diet they were disappointing and their contributions to the ascorbic acid contents of these diets were unexpectedly small. These foods are, of course, of great value in other respects.

Of the other vegetables and fruits, potatoes gave the most important amounts of ascorbic acid. There was much variation in the ascorbic acid of the servings and it is not possible to say that a particular way of preparation or cooking gave consistently better yields of the vitamin than another. It is indicated, however, that care should be taken to store, cook and serve vegetables so as to minimize the vitamin losses. The differences in the ascorbic acid contents of the potatoes as served were much larger than differences to be expected in the varieties of potatoes as harvested. Turnips, served 4 times in 25 days' diets, also gave good amounts of ascorbic acid. Fresh apples, which were served once, gave a negligible amount. Canned fruits such as peaches, pears and apricots did not give important amounts of the vitamin. The latter are, however, useful in improving the palatability of the diets at sea. Soups, served 15 times, gave only small amounts of ascorbic acid.

The various other foods served gave only small or negligible amounts of ascorbic acid. Pies, served 5 times, gave negligible amounts; liver, served 3 times, gave a small amount, and milk gave negligible amounts. Other foods, such as Irish stew, gave negligible amounts, or none, of the vitamin.

The contributions of the food "groups" as served to the total of 1867 mg. of ascorbic acid in the diets in 23 ships is shown in Table II. Citrus fruits and their juices, tomatoes and tomato juice and fortified apple juice were served

TABLE II
DISTRIBUTION OF ASCORBIC ACID IN THE FOODS AS SERVED IN
H.M.C. SHIPS IN HARBOUR

Foodstuff served	Number of times served in 23 days	Ascorbic acid	
		Total for 23 days for 1 man mg.	Per cent of total
Citrus fruits and their juices, tomatoes and tomato juice and fortified apple juice	25	1027	55
Potatoes.....	36	519	28
Leafy green and yellow vegetables.....	37	170	9
Other fruits and vegetables.....	20	82	4
Soup	15	69	4
	133	1867	100

25 times and gave 1027 mg. of ascorbic acid. Potatoes, served 36 times, gave 519 mg. Leafy, green and yellow vegetables, served 37 times, gave 170 mg. The other fruits and vegetables, served 20 times, gave 82 mg. Soups, served 15 times, gave 69 mg. Thus the citrus fruits and their juices, tomatoes and tomato juice and fortified apple juice supplied over 50 per cent of the ascorbic acid of the diet.

Ships at Sea

It was not feasible to determine the ascorbic acid contents of diets while at sea, but food collections were made on the return passage of a corvette, H.M.C.S. "Wetaskiwin", while on mid-ocean escort duty for 2 days before arrival at St. John's, Newfoundland. The results (Table III) indicate that

TABLE III
ASCORBIC ACID CONTENTS OF THE DAILY FOODS AS SERVED
FOR 1 MAN ON BOARD H.M.C.S. "WETASKIWIN" WHILE AT SEA

Date 1944	Foodstuff as served	How prepared	Weight of serving, g.	Ascorbic acid in serving mg.	Ascorbic acid per 100 grams of food, mg.
4 Oct.	Tomatoes	Canned	148	21.0	14.2
	Potatoes	Boiled	56	2.52	4.5
	Potatoes	Mashed	89	4.34	4.9
	Turnip	Boiled	69	1.76	2.5
	Soup	Cream of tomato	191	1.23	0.64
	Rice	Curried	59	0	0
	Corn	Canned	80	0.93	1.2
				<u>31.8</u>	
				<u>19.0</u>	
5 Oct.	Apple	Juice, canned	78	19.0	24.4
	Spinach	Canned	46	1.50	3.2
	Carrots	Diced, canned	49	0.10	0.2
	Potatoes	Scalloped	115	4.15	3.61
	Potatoes	Boiled	87	3.76	4.32
	Soup	Cream of corn	287	0.46	0.16
				<u>28.9</u>	

the foods served for 1 man per day for 2 days contained 32 and 29 mg. ascorbic acid. If an allowance of 15 per cent is made to cover possible losses due to holding the food samples in the refrigerator at 7°C. before analysis, these values would be 37 and 34 mg. respectively. The average value found for ships in harbour was 81 mg., indicating that the diets at sea may be lower in ascorbic acid. This agrees with our general observations that on arrival at port the personnel had a strong desire for fresh food, including fruits and vegetables, and tried to obtain as much of these as possible. The victualling depot realized this and made efforts to meet the demands.

Shore Establishments

The personnel at St. John's, Newfoundland, were supplied with meals in two large mess halls called the Upper and Lower Cafeterias. Surveys in both

mess halls were carried out in the summer of 1944 and in the spring of 1945. In these surveys the foods analysed for ascorbic acid contents were divided into 2 groups, (1) excellent sources of ascorbic acid such as citrus fruits and their juices, tomatoes and tomato juice and fortified apple juice, and (2) other sources of ascorbic acid, such as other fruits and vegetables, etc.

The results showed that in July 1944 the personnel in the Upper and Lower Messes obtained 41 and 45 mg. ascorbic acid per day respectively, and in April and June 1945, 61 and 56 mg. respectively. This improvement was due to better use of the issues of excellent sources of ascorbic acid and to the more frequent use of fresh vegetables in salads. The excellent sources contributed the major part of the ascorbic acid of the day's foods, since 57 to 72 per cent of the total ascorbic acid was contained in the citrus fruits and their juices, tomatoes and tomato juice and fortified apple juice. When these foods were omitted from the day's diet an abrupt fall in the ascorbic acid content was observed.

The values for ascorbic acid of the diet as determined did not agree well with the values as calculated. The calculated values were obtained by reference to the tables compiled by the National Research Council, U.S.A. (3), and by Bowes and Church (4). The calculated values which corresponded to the determined values of 41, 45, 61 and 56 mg. ascorbic acid were 60, 58, 96 and 83 mg. This result was not unexpected and provided an opportunity for the demonstration of the losses of ascorbic acid from vegetables such as potatoes, turnips and cabbage during storage and processing in the Service Establishments.

For example, old potatoes, peeled and boiled, in the summer of 1944 contained an average of 8 mg. ascorbic acid per 100 grams, whereas the new crop contained 16 mg. The old-crop peeled potatoes when (a) fresh, (b) boiled, and (c) mashed and allowed to stand $\frac{1}{4}$ hour, contained (a) 8.6 mg., (b) 5.2 mg. and (c) 1.1 mg. ascorbic acid per 100 grams. These are similar to results obtained by Branion, Roberts, Cameron and McCready (2) in their studies of nutritional conditions in the Royal Canadian Air Force.

DISCUSSION

It should be noted that the values given for the ascorbic acid contents refer to the amounts present in the foods as served and therefore to the amounts which the personnel receive. The foods are handled, stored, preserved, cooked and served in such a variety of ways that it is difficult to gauge the actual intake by other means. The daily foods served for 1 man in the ships in harbour contained the highest average amount of ascorbic acid (81 mg.). In the shore establishment messes the average intake in 1944 was about 43 mg. and in 1945 about 59 mg., the improvement being due chiefly to the better use of vegetables, as in salads, and possibly to better methods of cooking. These diets of the Royal Canadian Navy are similar with respect to ascorbic acid contents to the diets of the Royal Canadian Air Force as reported by Branion, Roberts, Allman, Billingsley and Woodward (5). The distribution of ascorbic

acid was similar also, since over one-half of the total occurred in the citrus fruits and their juices, tomatoes and tomato juice and fortified apple juice. The Royal Canadian Naval diets compare favourably with the ascorbic acid contents of the foods served in a ship of the Royal Navy, in which 16 mg. per day were found during the first week and 30 mg. during the second week of the survey (6). Since the present survey relates to the diets of Naval ships and establishments in Newfoundland it is relevant to note that certain Newfoundland civilian diets in outlying districts probably contained very much less ascorbic acid (7, 8). The National Research Council (U.S.A.) recommended a daily allowance of 75 mg. of ascorbic acid; this was met only by the diets of ships in harbour, but the necessary allowance is not yet settled (9, 10, 11).

While this dietary survey was in progress, Surgeon Lieutenant Watt (1) conducted a careful examination of the nutritional status of the personnel and found no general evidence of ascorbic acid deficiency, so that it may be concluded that the diets were satisfactory in this respect.

When asked to give their opinions of the diets, the personnel made relatively few comments on the supply of fruits and fruit juices and seemed to think that it was adequate. It was frequently suggested, however, that more fresh green vegetables would be desirable and that salads should be given more often. When dealing with practical nutritional problems the conclusions reached are usually not based wholly on the results of chemical determinations. The information available may not be adequate to cover all the points raised, practical matters must be considered and the matter of palatability is very important. It is considered that this work has demonstrated the value of the daily issues of citrus fruits and their juices, tomatoes and tomato juice and fortified apple juice and has justified their inclusion in the Scale of Rations.

SUMMARY

The ascorbic acid content of the foods as served in certain H.M.C. Ships and Establishments were determined. The highest average content (81 mg. per man per day) was found in ships in harbour. The foods served in one corvette during 2 days at sea contained 34 and 37 mg. The foods at Shore Establishments in St. John's, Newfoundland, contained on the average 43 and 59 mg. per day in the summer of 1944 and the spring of 1945 respectively. Over 50 per cent of the ascorbic acid of the foods as served occurred in the citrus fruits and their juices, tomatoes and tomato juice and fortified apple juice. Potatoes were next most important and contributed 28 per cent of the total ascorbic acid of the diet.

It gives us much pleasure to acknowledge the support of Surgeon Captain C. H. Best, R.C.N. (R), Director, Medical Research Division, in this work and the help generously given by officers and men of the Royal Canadian Navy, of whom there were too many to mention individually. We wish to acknowledge also our indebtedness to the pioneer studies of the R.C.A.F. Nutrition Laboratories in this field.

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Use of Mueller's Potassium Tellurite Medium in the Detection of *Corynebacterium Diphtheriae*

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Montreal, P.Q.*

DIPHThERIA has been and still is a major problem in the Province of Quebec. Despite the fairly intensive immunization practised in this province during the past several years, 1,394 cases of diphtheria were reported to our epidemiologist (1) in 1946—a morbidity rate of 38.19 per 100,000. Excluding specimens from the cities of Montreal and Quebec, which are sent to the municipal laboratories, a total of 14,658 specimens were examined in that year by the Ministry of Health for the presence of *C. diphtheriae*; of these, 15 per cent gave positive results. This large amount of work, coupled with a lack of adequate laboratory personnel, necessitated limiting bacteriological investigation to a search in a stained smear from a culture on Pai's medium for an organism morphologically similar to *C. diphtheriae*. The limitations of this method and the impracticability of isolating all positive or doubtful cultures induced the writer to study a potassium tellurite medium which might permit a laboratory result based not only on the morphology but also on the colonial characteristics of the organism. To this end, Mueller's (2) new tellurite plating medium was chosen as it appeared to be easily reproducible, satisfactorily inhibitive to contaminants, and rich enough to favour the growth of most diphtheria bacilli.

The addition of potassium tellurite to various media as a means of differentiating the diphtheria bacillus from other organisms is not a novelty in bacteriology. Conradi and Troch (3), in 1912, were the first to use a tellurite medium for the isolation of *C. diphtheriae*. Later, numerous workers, Douglas (4), Gilbert and Humphreys (5), Anderson and McLeod (6), used tellurite media for isolation and typing purposes. In the last decade, numerous workers in various parts of the world, mainly England, Australia, the United States and Canada, have advocated the use of tellurite media for the routine detection of *C. diphtheriae* in public health laboratories. Sutherland and Iredale (7), Kerrin and Gaze (8), Frobisher (9), Perry and Petran (10), Wilson (11), Cooper et al. (12), Hoyle (13), Young (14), Cruickshank (15), Knox (16), and others, working mostly with convalescent and contact carriers, reported favourable results.

During an epidemic of diphtheria in Halifax, in 1945, Bynoe and Helmer (17), comparing direct plating on tellurite media with stained smears taken from Loeffler's cultures, found that, for diagnostic purposes, direct tellurite plating permitted the detection of more positive cases than the traditional Loeffler's method. Kellogg and Wende (18) urged the use of a tellurite plating medium instead of Loeffler's for the routine detection of *C. diphtheriae* from convalescent

and contact carriers. Upon examining 622 swabs, they found 222 positive with tellurite whereas only 113 could be observed with Loeffler's slants. Mueller and Miller (2) recently reported very favourable results on examining thousands of American soldiers for detection of non-contact carriers. These authors emphasized the time saved by the use of their new tellurite medium.

PURPOSE AND METHOD

The purpose of this study was not to reinvestigate the superiority of tellurite media over Loeffler's or Pai's media which has been proven beyond doubt by numerous workers. It has been rather to study a plating tellurite medium which, while easy to prepare and reproduce, might provide the factors necessary for rapid and characteristic growth of minute inocula of *C. diphtheriae*. Such a medium might be used as a primary medium, permitting an accurate laboratory diagnosis by simple plate inspection supplemented, when necessary, by the microscopic examination of a stained smear taken from a positive or doubtful colony. The result of this procedure, if successful, would be particularly useful in the detection of contact and non-contact carriers and eliminate the prolonged, tedious, often unnecessary search for diphtheria bacilli on smears showing few or doubtful organisms lost in a thick background of contaminants.

During this study, the routine procedure followed in this laboratory of using Pai's medium was supplemented by a parallel examination on Mueller's plating medium. Throat and nose swabs, received by mail, were dipped in dextrose broth, then cultured on Pai's medium, then streaked on Mueller's plates. Pai's (19-20) medium was prepared according to directions in "Diagnostic Procedures and Reagents" (19). The Mueller's potassium tellurite medium, composed of a dehydrated agar base and a fluid concentrated serum-tellurite solution, was supplied through the courtesy of Difco Laboratories. Each tellurite plate, divided in four quadrants with a wax pencil, was streaked directly with the swabs, one quadrant being used for each specimen. Nose and throat swabs sent for aid in diagnosis were smeared on separate sections whereas both the nose and throat swabs from a convalescent or a contact carrier were streaked on the same section. After 15-18 hours' incubation of both media, smears from Pai's slants were stained with Loeffler's methylene blue and with a granule stain (Albert's) and examined for organisms resembling *C. diphtheriae*. The growth present on Mueller's medium was examined under a low-power microscope. The definitely negative cultures were excluded without further study but confirmatory smears were made of positive or doubtful colonies and stained as indicated above. Typical and atypical organisms were then subcultured on Pai's, the cultures checked for purity and finally identified by their fermentative reactions. With the exception of a few typically positive strains on both Pai's and Mueller's, all strains were isolated and identified as *C. diphtheriae* when dextrose positive and sucrose negative.

As virulence tests are performed in this laboratory only when especially requested, the results of the limited number of these made will not be considered in this study.

RESULTS

A comparative study of 1,000 specimens in order of their reception at the laboratory was undertaken. They may be divided into three groups: 309 specimens for aid in diagnosis, 167 for release of convalescents and 524 for detection or release of contact and non-contact carriers. One experienced examiner made the microscopic examination of stained smears taken from Pai's slants. Another examiner, working independently and without knowledge of the result of examination of the Pai slant, was responsible for the inspection of tellurite plates, the fishing of suspected colonies, and the isolation and identification of organisms if necessary.

When the bacteriological identification depended only on morphological characteristics, the results were reported as positive, doubtful, or negative. The term "doubtful" was applied to atypical organisms.

TABLE I
Before isolation

Medium	Pai	%	Mueller	%
Positive	145	14.5	170	17.0
Doubtful	42	4.2	16	1.6
Negative	813	81.3	814	81.4

TABLE II
After isolation

	Pai	%	Mueller	%
Positive	142	14.2	180	18.0
Negative	858	85.8	820	82.0

Table I shows the results of examination, based on organism morphology alone, of specimens cultured on Pai's slants, as well as those based on colony appearance and organism morphology of specimens cultured on Mueller's plates. Forty-two Pai cultures and 16 Mueller cultures were termed "doubtful". The positive Pai cultures numbered 145 whereas the number of positive Mueller plates was 170. The two media yielded approximately identical numbers of negative results.

Table II gives the final results after fermentation studies. The total of 170 positive cultures based on colony appearance and morphology on Mueller's was increased to 180 positive by the addition of 10 positive cultures from the doubtful group. On the other hand, after isolation and biochemical studies, positive cultures from Pai's dropped from 145 positives to 142 despite the fact that 10 cultures from the doubtful group were found to be *C. diphtheriae*. Thus, irrespective of the source of the specimens, 38 specimens (3.8 per cent of all specimens) more were found positive by the use of Mueller's tellurite plates than by usual Pai slants.

Simple colony inspection on Mueller's medium resulted in the elimination of 668 or 66.8 per cent of the specimens as negative; 332 or 33.2 per cent of the specimens producing suspected *C. diphtheriae* colonies were examined, and found to yield 180 positive and 152 negatives. These negative cultures were roughly equally divided between diphtheroids and cocci of various types.

TABLE III
Comparison of Pai's Medium and Mueller's Tellurite Medium in the
Examination of 1,000 Swabs

P +	P +	P -	P -
M +	M -	M +	M -
140	17	40	803

In Table III, the results of the examination of 1,000 nose and throat swabs by the two methods are summarized. A total of 140 specimens were positive for *C. diphtheriae* by both methods. The microscopic examination of smears from Pai slants showed 17 specimens to contain organisms morphologically similar to *C. diphtheriae* whereas no characteristic growth was obtained on Mueller's plates, but when these 17 Pai cultures were transferred to Mueller's tellurite media, diphtheria bacilli were isolated from only 2; from the other 15 unconfirmed positives, diphtheroids were recovered, giving a false positive rate for Pai's medium of 1.5 per cent. On the other hand, 40 specimens when streaked on Mueller's plates were found positive after isolation whereas smears from Pai's medium were negative. Although negative Pai's cultures were not streaked on Mueller's to ascertain if diphtheria bacilli were present, it may be concluded, therefore, that the proportion of false negative cultures on Pai's medium was at least 4 per cent.

TABLE IV
Comparison of Pai's and Mueller's Media in the Examination of 1,000 Swabs
according to the Purpose of Examination

Diagnosis (309)					Convalescent (167) Carriers				Contact and (524) non contact carriers			
	P.	%	M	%	P.	%	M	%	P.	%	M	%
Pos.	46	15	51	16.5	38	23	49	29	58	11	80	15
Neg.	263	85	258	83.5	129	77	118	71	466	89	444	85

Table IV shows the results of the parallel examinations of 1,000 nose and throat swabs according to the purpose of examination. During this study, 309 specimens were received for aid in diagnosis of diphtheria; the use of Mueller's medium revealed 5 more positives than that of Pai's, a percentage increase of 1.5 per cent. For release of convalescent carriers 167 specimens were received; in 11 cases, Pai's slants were negative whereas Muller's plates were positive, 6 per cent in favour of the latter. As information sheets accompanying specimens sent to this laboratory for detection of carriers frequently did not differentiate between contact and non-contact carriers, these two varieties of carriers are considered as a single group. In this group of 524 specimens, 58 or 11 per cent were found positive on Pai's slants and 80 or 15 per cent gave positive results when cultured on Mueller's plates, an increase of 4 per cent in favour of the tellurite medium. As might be expected, convalescent and carrier specimens gave doubtful results with Pai's slants much more frequently than did specimens submitted for aid in diagnosis.

DISCUSSION

Until recent years, microscopic examination of stained smears of cultures on Loeffler's medium has been the traditionally accepted laboratory procedure for aid in the diagnosis of diphtheria. Consequently, whereas tellurite media have served mainly for isolation and typing purposes, their routine use for detection of *C. diphtheriae* after direct swab plating has been adopted by few public health laboratories.

In a study of various media used for detection of *C. diphtheriae*, Frobisher and McGuigan (20) found that Pai's egg-medium was as reliable as Loeffler's serum medium. Accordingly, this laboratory has been using Pai's instead of Loeffler's because of its simplicity and ease of preparation.

Even the employment of Pai's medium, however, is subject to several disadvantages inherent in the use of such non-differential media, including Loeffler's: the necessity of depending for differentiation upon morphology alone, the rapid overgrowth of *C. diphtheriae* by contaminants, the occasional failure of some strains of diphtheria organisms to grow, as noted by Kellogg and Wende (18). Mueller's medium, on the other hand, offers an additional means of differentiation, the appearance of the colonies of organisms on the plate; it is markedly inhibitive toward contaminants; and unlike most tellurite media that have been proposed, it permits rapid growth of *C. diphtheriae* (of 180 positive cultures, only 2 required more than 24 hours for the production of characteristic colonies on this medium).

Mueller (2) expressed doubt of the significance of the so-called "typical morphology" of *C. diphtheriae* shown by smears from Loeffler's slants and of that of the "atypical aspects" of these organisms when cultured on tellurite media. This problem of disputed "typical" morphology will perhaps be solved when a more nearly perfect medium, offering optimal conditions for growth as in the human host, is prepared. Until then, a medium like Mueller's, providing diphtheria organisms with a very favourable environment, should sustain the growth of the great majority of these organisms. In this study, atypical organisms of doubtful morphology were nearly three times as numerous on Pai's as on Mueller's medium. Since isolation and fermentation tests showed 20 per cent of atypical cultures on Pai's to contain *C. diphtheriae* and 60 per cent of those on Mueller's medium to contain them, it follows that if a laboratory cannot isolate and identify all positive cultures, it should at least identify all cultures showing atypical organisms on microscopic examination in order to relieve the physician or medical officer of the perplexity attendant upon the receipt of a "doubtful" laboratory result.

The microscopic examination of stained smears for detection of *C. diphtheriae* is tedious and time-consuming. By simple low-power microscopic inspection of Mueller's plates, two-thirds of our specimens were rejected as negative. As various workers have indicated, however, bacteriological examination in diphtheria should not be based only on colony appearance because colonies of *C. diphtheriae* are not unique in character; some cocci and diphtheroid colonies closely resemble those of typical *C. diphtheriae*. A stained smear of the colonies should be examined.

In a report on the distribution of *C. diphtheriae* types found in Canada, Bynoe (22) stated that the intermedius type was prevalent in the Province of Quebec in the proportion of 74 per cent. On Mueller's tellurite medium, intermedius type colonies are minute in size and show very little darkening after 18 hours of incubation. Under the low-power microscope, they appear to be rough, flat, with irregular edges, "bursting" under the platinum wire. No real diffi-

culty was experienced in detecting the larger colonies presenting the characteristics of the gravis type. As noted by Mueller, many cocci and diphtheroids simulate the morphology of the mitis type; in the present study, of 332 suspected corynebacterial colonies examined, 152 consisted of diphtheroids or various cocci.

The concentration of potassium tellurite recommended for media by different workers is far from uniform. In this study, various concentrations of tellurite solutions were tried in order to arrive at a level where the inhibition of contaminants is at its best, whereas the growth of *C. diphtheriae* is still profuse, rapid and characteristic. The first 200 specimens were cultured on the standard Mueller's medium giving a final tellurite concentration of 0.05 per cent. As this concentration was not giving entirely satisfactory inhibition, a concentrated 5 per cent serum-tellurite solution was used, as advocated by Lev, Pohl and Tucker (23), to bring the tellurite concentration to 0.125 per cent; no important change in colony characteristics or in number of *C. diphtheriae* colonies was observed, and as it proved more inhibitive to contaminants, this concentration was adopted for the examination of the remaining specimens. Some specimens were also examined, using a tellurite concentration of 0.24 per cent. With such a concentration, contaminants were practically eliminated, but *C. diphtheriae* colonies grew more slowly, were less numerous, smaller and had a tendency to darken much faster.

Though somewhat less impressive than those of some other workers—Young, 7 per cent (14), Cruickshank, 10-30 per cent (15), Kellogg and Wende, 18 per cent (18)—the results of this study show quite conclusively the superiority of Mueller's tellurite medium over Pai's in the routine detection of *C. diphtheriae*. Whereas the latter showed 14 per cent of the specimens to contain these organisms, Mueller's medium showed 18 per cent to contain them, resulting in a 4 per cent increase. This lower increase in percentage of positives secured through the use of tellurite is probably due to (a) the random choice of specimens examined, (b) the relatively low proportion of positives among these specimens, (c) the inclusion of numerous specimens, received for aid in diagnosis, from which satisfactory results are usually obtained by the use of Pai slants, (d) the greater experience of the examiner with Pai's than with the tellurite medium.

It is to be observed that even with diagnostic specimens the use of tellurite is of some advantage. Comparing Loeffler's slants with tellurite plating in the examination of 162 swabs from diphtheria cases, Bynoe (17) reported an increase of 2 per cent in positive results by the use of tellurite. In the present series, the corresponding increase was 1.5 per cent.

As previous investigators have pointed out, it is in the examination of swabs from convalescent and contact and non-contact carriers, where the number of organisms is relatively small, that the use of tellurite is particularly advantageous. In this study, 6 per cent more positives from convalescent carriers and 4 per cent more positives from contact and non-contact carriers were obtained by direct plating on Mueller's medium than by the usual method.

SUMMARY

In a study of 1,000 routine specimens examined for detection of *C. diphtheriae* using stained smears from Pai's slants and direct plating on Mueller's tellurite medium, 142 were found to be positive by the former, and 180 positive by the latter procedure. Although Pai's medium gives very good results with diagnostic specimens, even with them the use of Mueller's medium resulted in an increase in positives of 1.5 per cent. The most conclusive evidence of the superiority of Mueller's over Pai's medium was found in the examination of specimens from convalescent carriers and other carriers; 6 per cent more positives from the former and 4 per cent more from the latter resulted from the use of tellurite plating.

The use of Mueller's tellurite plating medium was found to be advantageous in several respects: it yields more accurate results than the usual procedure; the medium is simple and easily prepared; it permits a marked reduction in microscopic work because negative cultures may be rejected by colony inspection.

This tellurite medium should prove very useful in the routine examination of specimens submitted for aid in the diagnosis of diphtheria and particularly valuable in the detection of *C. diphtheriae* in specimens from convalescents, contact and non-contact carriers.

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THE THIRTY-SIXTH ANNUAL MEETING

AS the thirty-sixth annual meeting of the Canadian Public Health Association approaches, it is well to pause and consider the significance of these national meetings which have brought together public health workers from coast to coast since 1910, when the Association was established. The records of these meetings tell the story of the tremendous advances that have been made in public health in a period that includes two world wars. In 1910, when the Association was established to disseminate the knowledge of sanitation in all its branches, sanitation was foremost in the public health program, and its achievements, as reflected in the control of typhoid fever by water filtration and chlorination, and in the introduction of pasteurization of milk, occupied a leading place in the programs of the Association. Through the years the Association has provided its members with the opportunity of meeting and discussing professional problems and of learning of the advances in preventive medicine.

To the late Dr. H. E. Young, who for more than thirty years was Provincial Health Officer for British Columbia, Canada is indebted not only for the effective work in his own province but also for his outstanding leadership in public health. Dr. Young was the first health officer to provide a provincial public health nursing service and the first to establish a full-time health unit—in 1920 the first health unit in Canada was opened at Saanich, near Victoria. Provincially directed school medical services, including high schools, were also initiated by Dr. Young.

In 1936 the Association met in Vancouver at a time when the depression in Canada was bearing heavily upon public health work. The meeting was characterized by the optimism and enthusiasm so characteristic of the people of British Columbia. It is not without significance, therefore, that the thirty-sixth annual meeting is being held in Vancouver, since the sessions of the Executive Council will give consideration to the further expansion of the work of the Association, the conduct of important surveys, and the organization of provincial branches. British Columbia has made important advances in its public health services, and during the post-war years the Association will receive every encouragement in its forward-looking program.

The program committee, under the guidance of Dr. Amyot, the Association's President, have attempted to solve one of the contentious problems of most professional meetings—the fact that, because of the multiplicity of Section meetings, one is unable to hear all the papers that are presented. In order to overcome this to some extent, Sections are being limited to one session each and the emphasis of the remaining program has been placed upon special sessions with subjects of general interest to most public health workers, presented in panel discussion form. This change in policy is being tried not because Section meetings have proved uninteresting, but because it is thought that most of the time of the delegates should be spent in discussing topics and policy that are of national interest to all public health groups. The specialized interests should receive sufficient attention at the Section meetings and in those invaluable group discussions that invariably take place in the corridors and rooms in the intervals between official items on the program.

The Washington State Public Health Association and the Canadian Institute of Sanitary Inspectors will meet at the same time and their presence should add much to the success of the meeting. Amongst the distinguished visitors will be Dr. Carl E. Buck, Professor of Public Health Administration, School of Public Health, University of Michigan; Dr. Edward S. Rogers, Dean, School of Public Health, University of California; Dr. John A. Kahl, Assistant State Director of Health in Charge of Local Health Services, Washington State Department of Health; Dr. Nathan Sinai, Professor of Public Health, School of Public Health, University of Michigan; Dr. H. C. Schumacher, Consultant in Mental Hygiene, United States Public Health Service, District No. 5; Dr. W. R. Giedt, Epidemiologist, Washington State Department of Health; Dr. N. C. Wetzel, Paediatrician-Mathematician, Cleveland; Miss Kathleen Leahy, Director of the Public Health Nursing Program, School of Nursing, University of Washington; Dr. Jennie Rowntree, Professor of Home Economics, University of Washington; and Dr. L. M. Farner, Head, Industrial and Adult Hygiene Section, Washington State Department of Health.

The Executive Council, which is composed of representatives from each province and from the provincially organized associations, will meet for two sessions on May 17, the day preceding the general meeting. This will afford the opportunity for full discussion of the Association's plans and the presentation of reports outlining the activities of the past year.

The thirty-sixth annual meeting in Vancouver offers members an opportunity to see at first-hand the excellent organization of public health in the Province of British Columbia and in the City of Vancouver, and to have the benefit of an outstanding program to which leaders in public health from the United States are contributing. The program committee have arranged generously for the entertainment of members. Some can combine attendance with their holidays and the local committee will assist in every way in making possible a most profitable and enjoyable visit to Vancouver and Victoria.

THIRTY-SIXTH ANNUAL MEETING
CANADIAN PUBLIC HEALTH ASSOCIATION

in co-operation with

WASHINGTON STATE PUBLIC HEALTH
ASSOCIATION

and

CANADIAN
INSTITUTE OF SANITARY INSPECTORS

HOTEL VANCOUVER
VANCOUVER, BRITISH COLUMBIA

May, 17, 18, 19 and 20
1948

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Registration:

A Registration Desk will be established on the Mezzanine on Sunday, May 16, at 2.30 p.m. and will be maintained until the end of the conference.

A fee of \$7.50 will include registration and tickets for the reception and annual dinner on Wednesday, May 19, and the luncheons on Tuesday, May 18, and Thursday, May 20.

Reception and Annual Dinner:

A reception will be held in the Lounge on Wednesday, May 19, at 6.00 p.m. This will be followed by the annual dinner in the Ballroom (dress informal). Wives of members are cordially invited. Extra tickets for these functions will be available at the Registration Desk.

Special Travel Rates:**RETURN TRIP FOR ONE AND ONE-THIRD TIMES****THE COST OF A ONE-WAY TICKET**

The Canadian Passenger Association has granted reduced train fare to and from Vancouver. Delegates attending the meeting (and members of their immediate family) may purchase a one-way fare good for the dates shown below, and obtain at the same time a "Standard Convention Certificate" from the local station agent. The certificate will be validated at the meeting (fee, 25 cents), and it will entitle the holder to purchase a return ticket in Vancouver (up to and including May 24th) for one-third of the one-way fare. Return tickets are good for a period of 30 days from the date of purchase of the original ticket to the meeting.

TERRITORY	DATES "GOING" TICKET MAY BE USED
British Columbia May 13th to 19th inclusive
Alberta	
Saskatchewan	
Manitoba	
Ontario—from Armstrong and points west May 9th to 15th inclusive
All points east of Armstrong, Ontario.....	
Sleeping-car reservations may be made in the usual way.	

PROGRAM**MONDAY, MAY 17**

- 9.30 a.m.**—WASHINGTON STATE PUBLIC HEALTH ASSOCIATION..... Ballroom
—BRITISH COLUMBIA PUBLIC HEALTH INSTITUTE.... Mayfair Room

- 12.30 p.m.**—Joint Luncheon..... Panorama Room
WASHINGTON STATE PUBLIC HEALTH ASSOCIATION and
BRITISH COLUMBIA PUBLIC HEALTH PERSONNEL
Speaker: DR. NATHAN SINAI, Professor of Public Health, School of Public
Health, University of Michigan.

- 2.30 p.m.**—WASHINGTON STATE PUBLIC HEALTH ASSOCIATION:
Ballroom
Salon E
Patricia Room, Hotel Georgia
Connaught Room, Hotel Georgia
Medical-Dental Auditorium
—BRITISH COLUMBIA PUBLIC HEALTH INSTITUTE.... Mayfair Room
—Executive Council, CANADIAN PUBLIC HEALTH
ASSOCIATION..... Salon B
—British Columbia Branch, CANADIAN INSTITUTE OF
SANITARY INSPECTORS..... York Room
(Hotel Georgia)

- 7.30 p.m.**—Executive Council, CANADIAN PUBLIC HEALTH
ASSOCIATION..... Salon B
—Fourteenth Annual General Meeting, CANADIAN
INSTITUTE OF SANITARY INSPECTORS..... York Room
(Hotel Georgia)

TUESDAY, MAY 18, 9.30 a.m.

**EPIDEMIOLOGY SECTION
Salon A**

Chairman: DR. C. E. DOLMAN.

Two Fatal Cases of Type B Botulism from Home-canned Asparagus.

DR. C. E. DOLMAN and MISS DONNA E. KERR, Division of Laboratories, Department of Health and Welfare of British Columbia, Vancouver.

Tuberculosis Mortality.

DR. D. L. MACLEAN, Professor of Public Health, School of Hygiene, University of Toronto, and Research Associate in the Connaught Medical Research Laboratories.

Poliomyelitis.

DR. J. S. KITCHING, Assistant Medical Officer of Health, Hamilton, Ontario.

The Diphtheria Convalescent Carrier Problem—Outbreaks due to Premature Release of Carriers.

DR. C. E. DOLMAN, MISS VIVIANNE G. HUDSON, and MISS DONNA E. KERR.

A Study of Infant Mortality in British Columbia Based on Birth, Death Linkage.

MR. JOHN DOUGHTY and MISS D. BELL, Division of Vital Statistics, Department of Health and Welfare of British Columbia, Victoria.

A Study of the Diphtheria Experience in the R.C.A.F. Subsequent to the Use of Diphtheria Toxoid.

WING-COMMANDERS A. H. SELLERS and G. D. CALDBICK and FLIGHT-LIEUTENANT J. B. HARDIE, Royal Canadian Air Force.

Current Immunization Procedures of the Canadian Army.

LIEUTENANT-COLONEL E. J. YOUNG, R.C.A.M.C., Department of National Defence, Ottawa.

TUESDAY, 9.00 a.m.

**CANADIAN INSTITUTE OF SANITARY INSPECTORS
(British Columbia Branch)
Medical-Dental Auditorium**

Chairman: MR. ELLIS FORD, President, British Columbia Branch, Canadian Institute of Sanitary Inspectors.
To be announced.

TUESDAY, 9.15 a.m.

**INDUSTRIAL HYGIENE SECTION
Patricia Room (Hotel Georgia)**

Chairman: DR. W. G. SAUNDERS, The Medical Clinic, Vancouver, B.C.

Silicosis in British Columbia. (With film.)

DR. C. H. VROOMAN, Consultant in Chest Medicine, Workmen's Compensation Board, Vancouver, B.C.

Medical Rehabilitation of Workmen.

DR. W. E. MILBRANDT, Medical Director, Workmen's Compensation Board Rehabilitation Clinic, Vancouver, B.C.

Vocational Rehabilitation.

MR. JOHN HUMPHREYS, Chief Rehabilitation Officer, Workmen's Compensation Board, Vancouver, B.C.

Some Phases of Industrial Medicine.

DR. F. S. PARNEY, Chief, Industrial Health Division, Department of National Health and Welfare, Ottawa.

Industrial Psychiatry.

DR. C. H. GUNDRY, Mental Hygienist and Director of School Health Service Metropolitan Health Committee, Vancouver, B.C.

Coordination of Industrial Hygiene with the General Health Field.

DR. L. M. FARNER, Head, Industrial and Adult Hygiene Section, State Department of Health, Seattle, Wash.

TUESDAY, 9.30 a.m.

PUBLIC HEALTH EDUCATION SECTION
Court House—Room 235

Chairman: DR. JULES GILBERT, Director of Health Education, Ministry of Health, Quebec, and Assistant Director, School of Hygiene, University of Montreal.

Evaluation of the Usability of Health Education Materials.

MRS. KAY BEARD, Consultant, Health Education, Provincial Department of Health, British Columbia.

The Development of the School Health Curriculum.

MR. S. S. LIFSON, Secretary, School Health Section, American Public Health Association.

Teacher Workshop Techniques.

MISS ALICE HEATH, Senior Health Education Consultant, Washington State Department of Health.

Methods and Materials in School Health Education.

MISS ANNE GRANT, Health Education Secretary, Canadian Tuberculosis Association.

TUESDAY, 9.30 a.m.

PUBLIC HEALTH NURSING SECTION
Mayfair Room

Chairman: MISS TRENNIA G. HUNTER, Director of Nursing, Metropolitan Health Committee, Vancouver, B.C., and Vice-Chairman of the Section.

Committee Reports:

Report on "Public Health Nursing Day".

MISS E. A. ELECTA MACLENNAN, Assistant Directress, School for Graduate Nurses, McGill University, Montreal.

Report of the Study Committee.

MISS ISOBEL BLACK, Assistant to the Chief Superintendent, Victorian Order of Nurses for Canada, Ottawa.

Reports of Sub-Committees:

Qualifications for Employment in Public Health Nursing Positions.

MISS ELIZABETH A. RUSSELL, Director of Public Health Nursing, Department of Health and Public Welfare of Manitoba, Winnipeg.

Means of Improving Public Health Nursing Services.

MISS DOROTHY TATE, Director of Public Health Nursing, Department of Health of British Columbia, Victoria.

What is Essential Public Health Nursing?

MISS LYLE CREELMAN, Study Committee on Public Health Practices, Canadian Public Health Association, Toronto.

Discussion.

The Meaning of Illness.

MISS HELEN SUTHERLAND, Provincial Supervisor of Social Services for the Divisions of Tuberculosis Control and Venereal Disease Control, Department of Health and Welfare of British Columbia.

Establishing and Maintaining Relationships among Public Health Personnel.

MISS KATHLEEN LEAHY, Director of Public Health Nursing Program, School of Nursing, University of Washington.

TUESDAY, 9.30 a.m.

PUBLIC HEALTH ADMINISTRATION SECTION
Salon B

Chairman: DR. M. R. ELLIOTT, Director, Extension Health Services, Department of Health and Public Welfare, Province of Manitoba.

Panel Discussion: The Changing Emphasis in Public Health.

DR. E. S. ROGERS, Dean, School of Public Health, University of California—**Panel Leader.**

DR. J. M. HERSHEY, Assistant Provincial Health Officer, Department of Health and Welfare of British Columbia.

DR. B. BUCOVE, Regional Health Officer, Weyburn, Saskatchewan.

DR. D. W. S. PUFFER, Assistant to the Chief Medical Officer of Health, Department of Health for Ontario, Toronto.

DR. GORDON P. JACKSON, Medical Officer of Health, Toronto, Ontario.

Evaluation of Public Health Service.

DR. CARL E. BUCK, Professor of Public Health Administration, School of Public Health, University of Michigan.

The Development of a Health Unit, with Special Reference to Field Studies.

DR. WILLIAM MOSLEY, Director, East York—Leaside Health Unit, Ontario.

Business Session.

TUESDAY, 9.30 a.m.

NUTRITION SECTION

Connaught Room (Hotel Georgia)

Chairman: DR. L. B. PETT, Chief, Nutrition Division, Department of National Health and Welfare, Ottawa.

Introductory Review.

DR. JENNIE ROWNTREE, Professor of Home Economics, University of Washington.

Practical Nutrition as Seen by a Nurse.

MISS EDITH HORTON, Supervisor of Public Health Nurses, Elgin-St. Thomas Health Unit, Ontario.

The Work of a Municipal Nutritionist.

MISS HELEN ROSS, Nutritionist, Metropolitan Health Committee, Vancouver.

Practical Nutrition as Seen by a Medical Officer of Health.

DR. H. SIEMENS, Medical Health Officer, Edmonton Rural Health Unit.

TUESDAY, 9.30 a.m.

VENEREAL DISEASE CONTROL SECTION

Court House—Room 105

Chairman: DR. B. D. B. LAYTON, Director, Division of Venereal Disease Control, Department of National Health and Welfare, Ottawa.

Résumé of Outstanding Events in the Venereal Disease Control Field, 1947.

DR. B. D. B. LAYTON, Chief, Division of Venereal Disease Control, Department of National Health and Welfare, Ottawa.

Premarital Examinations in Saskatchewan—Further Facts and Figures.

DR. H. S. DOYLE, Director, Division of Venereal Disease Control, Department of Public Health of Saskatchewan, Regina.

Recent Activities in a Provincial Venereal Disease Control Program.

DR. DAVID BEAULIEU, Joint Director, Division of Venereal Disease Control, Ministry of Health, Quebec.

Venereal Disease Control in a Nova Scotia Health Unit.

DR. M. R. MACDONALD, Divisional Medical Health Officer, Cape Breton Island Health Unit, Sydney, Nova Scotia.

Some Recent Developments in Venereal Disease Epidemiology.

DR. G. R. F. ELLIOT, Director, Division of Venereal Disease Control, Department of Health and Welfare of British Columbia.

Case-Finding in Venereal Disease Control.

DR. W. GORDON BROWN, Acting Director, Division of Venereal Disease Control, Department of Health for Ontario.

Congenital Syphilis with Unusual Arthritic Manifestations.

DR. EDWARD M. GEE, Director of Venereal Disease Control, Department of Health and Public Welfare of Manitoba.

TUESDAY, 12.30 p.m.

**LUNCHEON
Ballroom**

Speaker: THE HONOURABLE PAUL MARTIN, Minister of National Health and Welfare, Ottawa.

TUESDAY, 2.30 p.m.

**GENERAL SESSION
Mayfair Room**

Chairman: DR. G. F. AMYOT, President, Canadian Public Health Association, and Deputy Minister of Health for British Columbia.

Welcome to British Columbia.

THE HONOURABLE GEO. S. PEARSON, Honorary President, Canadian Public Health Association, and Minister of Health and Welfare for British Columbia.

Welcome to Vancouver.

HIS WORSHIP MAYOR CHARLES JONES.

Presidential Address.

DR. G. F. AMYOT.

Public Health Problems in Hospitals.

DR. W. R. GIEDT, Epidemiologist, Washington State Department of Health.

The Integration of Mental Hygiene Concepts and Practices in a Public Health Program.

DR. HENRY C. SCHUMACHER, Consultant in Mental Hygiene, United States Public Health Service, District No. 5.

WEDNESDAY, MAY 19, 9.30 a.m.

**GENERAL SESSION
Mayfair Room**

Panel Discussion on Medical Care:

DR. NATHAN SINAI, Professor of Public Health, School of Public Health, University of Michigan—**Panel Leader.**

DR. DONALD PATERSON, Vancouver, B.C.

DR. EDWARD S. ROGERS, Dean, School of Public Health, University of California.

DR. F. D. MOTT, Chairman, Health Services Planning Commission, Saskatchewan.

DR. H. H. MILBURN, Chairman, Committee on Medical Economics for British Columbia.

DR. WALLACE WILSON, Past President, Canadian Medical Association.

DR. F. W. JACKSON, Deputy Minister of Health, Province of Manitoba.

DR. J. M. HERSHEY, Assistant Provincial Health Officer, British Columbia.

WEDNESDAY, 1.00 p.m.

SIGHTSEEING

"A spectacular and novel introduction to the coastal beauties of British Columbia."

WEDNESDAY, 6.00 p.m.

RECEPTION

Lounge

WEDNESDAY, 7.00 p.m.

ANNUAL DINNER

Ballroom

THURSDAY, MAY 20, 9.30 a.m.

GENERAL SESSION

Mayfair Room

Symposium on the Wetzel Grid:

DR. D. V. HUTTON, Pediatric Specialist, Child and Maternal Health Division,
Department of National Health and Welfare.

DR. J. A. TAYLOR, Director, Central Vancouver Island Health Unit.

Discussion Leaders:

DR. N. C. WETZEL, Pediatrician-Mathematician, Cleveland, Ohio.

DR. H. C. SCHUMACHER, Consultant in Mental Hygiene, United States Public
Health Service, District No. 5.

DR. JENNIE ROWNTREE, Professor of Home Economics, University of Washington.

Public Health Education in Local Health Departments.

DR. JULES GILBERT, Director of Health Education, Ministry of Health, Quebec, and
Assistant Director, School of Hygiene, University of Montreal.

THURSDAY, 12.30 p.m.

LUNCHEON

Ballroom

Speaker: DR. G. D. W. CAMERON, Deputy Minister of National Health, Ottawa.

THURSDAY, 2.30 p.m.

GENERAL SESSION

Mayfair Room

Panel Discussion on Public Health Administration:

DR. CARL E. BUCK, School of Public Health, University of Michigan—**Panel Leader.**

DR. JOHN A. KAHL, Assistant State Director of Health in Charge of Local Health
Services, Washington State Department of Health.

DR. M. R. ELLIOTT, Director, Extension Health Services, Department of Health and
Public Welfare, Manitoba.

DR. LEONARD S. ROSENFELD, Director, Division of Regional Health Services, De-
partment of Public Health, Saskatchewan.

DR. A. SOMERVILLE, Supervisor of Rural Health Units, Department of Public Health,
Alberta.

DR. J. S. CULL, Director, Local Health Services, Department of Health and Welfare,
British Columbia.

Letter From Great Britain

FRASER BROCKINGTON,
M.R.C.S., Eng.; L.R.C.P., Lond.; D.P.H.; B. Chir., M.D., Camb.;
M.A., Camb.; Barrister-at-Law

*County Medical Officer
Public Health Department, West Riding of Yorkshire
Wakefield, Yorkshire, England*

A SECOND plebiscite is in the offing (18.1.48) to determine finally the reaction of doctors to the new Act. Since the first plebiscite at the end of 1946, discussions have been taking place on the outstanding points of difference between the British Medical Association and the Minister of Health, Mr. Bevan; these are outlined in my May, 1947, letter, namely, the sale of the goodwill of practices, the basic salary and "negative direction". The public generally and many doctors particularly, are in some doubt as to what it is all about; dimly through the fog and dust of conflict they see figures of a determined statesman and the hierarchy of the "B.M.A." contesting things which, putting it bluntly, don't seem to matter a tinker's curse. The doctors themselves voted for the abolition of goodwill sales in the first plebiscite, the basic salary of £300 per annum seems neither here nor there, and the refusal to allow entry to a public service in an over-doctored area seems no more than common sense and would appear inevitable in a nation organising itself for self-preservation, now talking of 'spivs and drones', and in which the barrow boys are being forced from the London streets into productive industry. An apparently endless correspondence takes place in medical journals and there are discussions all over the country at meetings of local medical associations; the daily press publish lengthy leaders; not for the first time reason is leaving by the window and passion flies in through the door.

Despite so much apparent obscurity, nevertheless the issue between the con-

testants is clear; it is the fate of the general practitioner which is at stake. For the most part the "B.M.A." has ceased to concern itself, if it indeed ever did so, either with that part of the Act which has created the new structure of hospital administration, including the regulation of the work of the consultants and specialists, or with the framework of the new local health authorities for preventive medicine. Considering how vital these are to the success of the whole and how intimately hospitals and social medicine must affect the practitioner's daily work, the relative unconcern of the "B.M.A." for Parts 2 and 3 during the past five years of negotiation has been perhaps the most remarkable feature of a happening full of strange and unexpected episodes. It is in the mirror of Part 4 of the Act, that part which concerns the work of practitioners, that the "B.M.A." has seen reflected the whole meaning of the National Health Service. Nothing can show more clearly the limited range of the general practitioner's vision and his unshakable belief that though the health of the nation may be anybody's business, his concern is with the patient. What the "B.M.A." wants to save the ordinary doctor from is 'Nationalisation', the fate which is being represented as 'worse than death', where the doctor is a salaried servant of the State, subject to bureaucratic control, a member of a hated thing called a "service" and subject to the jurisdiction of "Whitehall".

Therefore, to understand the thrust and counterthrust about basic salaries and the abolition of the goodwill of a

practice, the looker-on must realise that however trivial may appear to be the apparent fruits of victory, or consequences of defeat, yet it is not to secure these that Mr. Bevan strikes such mighty blows nor to prevent them that the "B.M.A." has parried with such obstinate courage. The on-looker must look beyond to the declared policy of the socialist party, which is to create a full-time salaried service, and he must see the relative ease with which this end can be achieved once the general practitioner has been deprived of the right to buy and sell his practice and as the Secretary of the B.M.A. has said, is 'unable to enter practice without the permission of a Whitehall Committee'; the fight is for the bottom rung of a ladder which is supposed to lead to the rarified regions of the civil service, with the doctors anxiously seeking to prevent the first fateful step; it seems of small immediate moment whether they stand on the ground or on the first rung, nor would it be so were it not that the subsequent steps which they see themselves forced to take will be so much more difficult, if not impossible, to resist.

Much play is made of the doctor's "liberty" and "the doctor-patient relationship", both of which assets the receipt of a salary for full-time service is supposed to imperil. With the reality or otherwise of such fears I cannot here deal, and, in any event, they are concepts which are common to all lands and upon which you will have your own views, nor should I say what value I personally place upon them, but it is important to realize that, so far as concerns modern Britain, these and all other prerogatives of a privileged class must be viewed, not in yesterday's rich glow of a prosperous nation, but rather in today's strong austere light of a national desire for efficiency, with the husbanding of resources and the progress of events towards order in the nation's affairs. We can today logically no more permit the use of our doctors inefficiently than, in a wholly different setting, we can allow

the barrow boys on the London streets to sell fruit which is as readily available in shops. I do not say that the work of the practitioner is necessarily inefficient, this would require a more careful enquiry; any such enquiry would be anathema to the doctor. But I refer to a common belief that the treatment of the few is made at the expense of the many, as suggested by the over-doctored resorts of the well-to-do, and to the widespread desire to see the general practitioner take a full part in a better mobilization of forces against disease and for health; in which the concept of service to the community is valued equally with the ideal of service to the individual sick person; in which the practitioner becomes a member of a team with the full resources of the public health department as well as hospitals at his disposal; in which the practitioner teaches and practices preventive medicine. Many doubt whether this is possible in the private practice set-up which has operated until today, or even in the new regime where income will advance with success in adding to the roll of panel patients. Freedom to fight for health rather than to stem disease can come only, so such thinkers hold, when the general practitioner receives a salary and joins the staff of the preventive field. In the sense that the fight for liberty is in conflict with this natural progress of events, the public, so far as they have been able to grasp the issues at stake, regard the doctors' interpretation of liberty as more truly defined as 'licence'. As Milton wrote in one of his sonnets:

"Licence they mean when they cry liberty.

For who loves that must first be wise and good."

But disorders do not yield to overdoses of medicine; assuming that Mr. Bevan has taken the correct bottle off the shelf, no doubt he contemplates further exhibitions of the same physic. We can only pray now that he proves as good a physician as he wishes the new state servant to be.

North York's New Dental Trailer

THE township of North York, adjacent to Toronto and with a population of 33,000, is giving a lead to municipal public health departments throughout Canada by introducing to their public services a dental trailer, designed and operated by the dental staff to give dental service to the pupils in the rural schools of the township. During April, 1939, dental service was instituted by the Board of Health in five large public schools in which dental clinics were installed. Since that time, there have been 12,373 fillings, 6,544 extractions, 2,337 prophylactic treatments, and 15,106 other procedures for a grand total of 36,360 dental procedures.



The dental service, examination and treatment, is offered to all pupils. Appreciation of the service is well demonstrated by the fact that about 80 per cent of all dental consent cards have been signed "yes". The trailer is taken to the rural schools by the travelling dentist, electric power is supplied by school outlets, and the day's work is soon under way. The trailer is fully supplied with permanent equipment and already has proved its value since the rural service was initiated on June 9, 1947.

The service is a very necessary and beneficial part of the school medical service (instituted in North York Township in 1925) and it assists in eliminating lost school days due to defective teeth with their attendant suffering. The pupils, as a whole, have gradually overcome the "dread" of visiting the dentist and consider it a part of the school program. This attitude should be of distinct advantage in post-school days when their dental health becomes their personal concern.

School boards, principals and teachers are very enthusiastic about the new rural dental service because it is a major contribution to the health of the pupil and to the increase in school attendance as well as a contribution to the instructional efficiency of the schools.—*Carl E. Hill, M.D., Medical Officer of Health, Township of North York, Willowdale, Ontario.*

The History of Medical Bacteriology in Manitoba

EGON STARK

*Department of Animal Pathology and Bacteriology
The University of Manitoba
Winnipeg, Manitoba*

THE history of bacteriology in Manitoba dates from 1894. This article attempts to review briefly the accomplishments which have been made since then and to give credit to those persons who were connected with the development of medical bacteriology in this province.

Dr. Gordon Bell was Manitoba's first teacher of bacteriology and the first Provincial Bacteriologist. He was born in the town of Pembroke, Ontario, in 1863. After graduating from the University of Toronto, he studied medicine in Winnipeg from 1887 until 1890 and from there went to Vienna for post-graduate work, after which he returned to Manitoba. In 1894 he was appointed to the staff of the Medical School at Winnipeg to teach bacteriology. Dr. W. E. Montgomery¹ says: "Gordon Bell was practically the only man in Manitoba who knew bacteriology; he was teaching that subject at the medical school. The Provincial Board of Health needed a bacteriologist. Bell was the only one who could do the work . . . Within a year he was not only bacteriologist, but epidemiologist and general factotum of the Provincial Board of Health."

This was in 1897, three years after the Provincial Board of Health was organized. In the same year the Provincial Bacteriological Laboratory, Manitoba's first bacteriological institution, was established. In 1906 it was moved from its original location on the corner of McDermot and Kate Streets into the building of the Medical College. The work of this laboratory rose from 2,002 tests in 1898 to 200,000 tests in 1946. Behind this steady in-

crease in the amount of work lay the untiring efforts of Dr. Bell. In the early years, Dr. Bell not only planned the type of work but he himself performed most of the tests; there was scarcely anyone who could help him. The speedy detection and prevention of the spread of such contagious diseases as diphtheria, tuberculosis, typhoid fever, and venereal diseases were the main objectives. On Dr. Bell's recommendation, a tuberculosis sanatorium was erected at Ninette, on Lake Pelican. He had not only a technical skill, which Dr. Montgomery called "phenomenal", but also an astonishing foresight of the needs of this province. When the University of Manitoba established a full-time Chair of Bacteriology and Pathology in 1904, Dr. Gordon Bell became the head of this department. In the reorganized Provincial Board of Health of 1916, Dr. Bell was appointed chairman, while retaining his position as Provincial Bacteriologist, and Dr. F. T. Cadham became Assistant Provincial Bacteriologist.

After a short illness, Dr. Bell died on August 8, 1923. It is unfortunate that he made but few contributions of scientific or literary value to medicine. He left only one letter on "serum treatment in glanders", and one article on a typhoid epidemic. Those who did not know Dr. Bell find it difficult, therefore, to realize his greatness. To those who did know him and who worked with him, he was an inspiration. He taught students, trained laboratory technicians, looked after the Provincial Laboratory, performed post-mortems as coroner's pathologist, gave advice to most of Manitoba's physicians, and

took an active interest and leading part in the improvement of public health in Canada. Dr. Gordon Bell was one of Western Canada's greatest physicians. To honour him, a high school in Winnipeg now bears his name.

Dr. Bell's successor was Dr. Fred Todd Cadham, who had been Assistant Provincial Bacteriologist. He became Manitoba's second Provincial Bacteriologist and Professor of Bacteriology and Immunology at the University of Manitoba. While retaining his professorship, he resigned as Provincial Bacteriologist in December, 1947, and was succeeded in this position by his son, Dr. Roper G. Cadham.

The Department of Public Health of the City of Winnipeg established a bacteriological laboratory in the City Hall, on Main Street, in 1905. In 1916, when compulsory testing of school children for diphtheria was begun, the number of tests rose to 15,528, of which 11,488 consisted of diphtheria swabs. After 1923, when the number of tests reached a peak of 22,164, 18,126 being diphtheria swabs, the work steadily declined to an average of 11,000 tests yearly.

Dr. J. H. Leeming was Winnipeg's first City Bacteriologist, occupying this position from 1905 until 1922, with the exception of the years 1914-1918, when he served in France. During his absence, his place was taken by Dr. W. J. Sharman. Dr. Manley S. Finkelstein was Winnipeg's second City Bacteriologist, serving from 1922 to 1925. He was succeeded by Dr. Morley S. Loughheed. In 1939, when the position of City Bacteriologist was abolished, the laboratory was transferred to the Food and Dairy Division of the Department of Public Health and Welfare, and Dr. Loughheed became the city's health officer, a position which he still holds.

The Provincial Veterinary Laboratory, located at the University of Manitoba, Fort Garry, Winnipeg, is doing considerable routine bacteriological work with animal specimens. It is under the direction of the Provincial Animal Pathologist, Dr. Alfred Savage, assist-

ed by Dr. J. M. Isa. This laboratory, the only one of its kind in Manitoba, was established in 1938 and fills a long-felt need.

Instruction in bacteriology dates from 1894, when Dr. Gordon Bell was appointed to the staff of the Medical School at Winnipeg. The University of Manitoba established a full-time Chair of Bacteriology and Pathology in 1904, and from then until 1911 Dr. Bell lectured on both subjects. In 1911 Histology was added. After Pathology became an independent subject under the professorship of Dr. William Boyd in 1915, Bacteriology was a separate entity until 1919, when the Faculty of Medicine was organized with Dr. Bell as head of the Department of Bacteriology and Hygiene. From 1927 until 1933, Bacteriology was again a separate department. As serology and immunology were taught in addition to bacteriology, the official title of the department was changed to Bacteriology and Immunology in 1933.

The first course, offered in 1903-04, consisted of fifty lectures, with laboratory practice, for third-year students. Today, second-year students are given a course in general bacteriology of two lectures and eight laboratory periods per week, while fourth-year students receive instruction in serology and immunology. The number of students instructed in medical bacteriology is somewhat constant. The average number in the ten-year period from 1913-14 to 1922-23 was 48 students annually, and in the ten-year period from 1931 to 1940-41, 49 students annually. This is due to the fact that the Manitoba Medical College has only a limited capacity and is working at full capacity most of the time. The bacteriological laboratory is constructed to accommodate only 50 students.

The research carried out in the Department of Bacteriology and Immunology deals primarily with septicaemia, arthritis, and various phases of serology and immunology. Research in medical bacteriology, however, is not confined to the department. Members

of the Faculty of Medicine have published numerous scientific articles on various phases of medical bacteriology. The names of the authors and the titles of the publications can be found in the "Lists of Faculty Publications", published by the University of Manitoba.

Manitoba has no qualified virologists and also lacks trained laboratory tech-

nicians. Low salaries and the absence of appropriations for research purposes impede the progress of medical bacteriology in this province. The realization does not prevail that the ultimate beneficiaries of any improvement in the field of medical bacteriology are the people of Manitoba themselves.

The writer is greatly indebted to Dr. F. T. Cadham for his kind assistance in supplying information and printed matter, which was not available otherwise, and for his advice and criticism regarding the manuscript.

BIBLIOGRAPHY

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Reports of the City of Winnipeg Department of Public Health and Welfare.

Reports of the President of the University of Manitoba.

Lists of Faculty Publications of the University of Manitoba, Parts I and II.

BOOKS

Sexual Behavior in the Human Male.

By Alfred C. Kinsey, Wardell B. Pomeroy, and Clyde E. Martin. Philadelphia and London: W. B. Saunders Company, 1948. 804 pages. \$7.50. Canadian agents: McAtinsh & Co., Ltd., Toronto.

THIS TEXT, which is the first of a series of works on the sexual behavior of citizens of the United States of America, has been described by reviewers as "comparable in importance to Darwin's *Origin of the Species*," "unscientific," "the first scientific approach to the subject", and "epoch-making". So many reviews have been written in the lay and professional literature since its release—and indeed prior to its release—and the advance notices and comments were so numerous that this review may seem superfluous, as it would appear that the book is approaching the top of the "best seller" lists and everyone who is even remotely concerned with this important aspect of human behavior is reading the text for himself.

The authors have set themselves the monumental task of obtaining, by personal interview, the sex behavior histories of one hundred thousand persons. Twelve thousand have been completed to date. This volume represents an analysis of the first five thousand, three hundred histories of white males.

In reading this report one would be wise to constantly bear in mind the following excerpt from the introductory chapter. "The study

represents an attempt to accumulate an objectively determined body of fact about sex which strictly avoids social or moral interpretations of the fact. Each person who reads this report will want to make interpretations in accordance with his understanding of moral values and social significances; but that is not part of the scientific method and indeed, scientists have no special capacities for making such evaluations."

A critical review of the statistical methods would require considerable space and is probably not warranted here as it is the opinion of this reviewer that the importance of this book does not, as some have stated, rest upon the absolute validity of the information collected. It has often been stated that considerable memory distortion may take place in recalling experiences or activities of a highly emotional nature, but even if we accept this opinion and assume that part of the information collected is tinged with memory distortion one way or the other, there is still sufficient similarity apparent in the data to make them significant.

From a public health point of view, this book should be invaluable to workers who are responsible for preparing teaching material in sex hygiene in relation to health. The reported variations in the sexual behavior and attitudes of groups who have progressed to different educational levels should be taken into consideration by all concerned in preparing edu-

cational material or compiling laws in respect to so-called "sex crimes" or regulations pertaining to prison or reform institutions.

There will be further volumes relating to other aspects of the sexual behavior of humans, and they will, in all probability, produce just as much controversy as this volume has. All of which will eventually do far more good than the "harm" which is predicted by some reviewers, as it is high time that this vital phase of human relations received the scientific study it requires to remove it from the skeleton-closet of present-day mysticism and emotionalism.

J. H. BAILLIE

140 Million Patients. By Carl Malmberg. New York: Reynal & Hitchcock, 1947. Canadian agents: McLelland & Stewart Ltd., Toronto. 242 pages. \$3.25.

THE AUTHOR, who has been an information specialist for the U.S. Public Health Service and investigator for the U.S. Senate Subcommittee on Health and Education, was formerly a public relations adviser and has written numerous magazine articles on or pertaining to medical subjects. He is the author of *Diet and Die* (1935).

140 Million Patients is stated to contain "revealing facts behind health and medical care in America". The text of the book has been carefully prepared in an attempt to startle citizens, medical and health workers and other interested groups, out of a complacent acceptance of the oft-repeated statement that the people of the U.S.A. are the world's healthiest and that they have adequate medical care. The main technique used by the author to accomplish this end is to take prepared papers, speeches and other documentary evidence of the medical and allied professions and use it as a self-indictment of the existing system of supplying medical care. All students of medical care and economics will not agree with the data or their presentation, but everyone interested in the provision of voluntary, compulsory, or any form of medical care or health insurance should read this volume.

The book is divided into six main sections: *Health Inventory*, *The Cost of Sickness*, *How Good is American Medical Care?* *Prescription for Better Health*, *Voluntary Plans—Too Little and Too Late*, and *140 Million Patients Can't Be Wrong*. The author's selection of titles to his chapters is guaranteed to arouse

considerable comment and it would appear that is exactly what he is attempting to do. He is obviously an outspoken advocate of national health insurance of a compulsory nature, and his factual data will cause many physicians who are satisfied with the present or past status of the medical services to accuse him of emotional propaganda. Members of the profession who wish to study both sides of a question will find this book to be a clear, interesting statement of medical care as it exists in the U.S.A. (and most, if not all, of the facts could be applied to the Canadian scene) and a suggested method of improving this rather depressing picture.

J. H. BAILLIE

The History of the Victorian Order of Nurses for Canada: 50th Anniversary. 1897-1947. By John Murray Gibbon. *Victorian Order of Nurses*, 114 Wellington Street, Ottawa, 1947. 124 pages. \$2.00.

WHEN you open this attractively bound, well illustrated book to read the saga of the Victorian Order of Nurses for Canada, you are reluctant to close its covers until you reach the very end. The blue-uniformed nurse of the Victorian Order is so much a part of many of our communities today that few of us realize that it was only fifty years ago that a district nursing service in Canada was first suggested. In 1896 the idea was proposed to Lady Aberdeen by two members of the Vancouver Local Council of Women, and in the following months she pursued with great determination the organization of such a service. A year later, in November, Charlotte Macleod arrived in Ottawa to become the first superintendent of the Order.

As public health nurses, we read with keen interest the early beginning of training in public health nursing. The account of the four nurses who took the Klondike Trail in 1898 is thrilling and we momentarily wish there were such opportunities today—and then we realize that public health nurses are travelling into the far north, by plane, by dog sled, or by whatever means will enable them to reach those who are in need of their service.

As we read of the Cottage Hospitals which were started by the Victorian Order of Nurses and which were centres to which the sick of the community came for healing and advice, we can think of them as the beginning of to-

day's concept of the hospital as a community health centre.

We again leap from the past to the present and future when we read of Miss Mary Ard MacKenzie's reference to the use of Home Helpers—women who could "be called on when needed, would go with the nurse to patients' homes, look after the house, do the cooking, washing, etc., under the nurse's guidance, and be left in charge of the patient and home after a time while the nurse passes on to a more urgent case." Today, thirty-nine years later, in a period in which there is an acute shortage of nursing personnel, the use of the "home helper" is relatively untouched in the public health nursing field.

And so now at the end of the first fifty years in the development and service of the Victorian Order in Canada we know that it will continue to play a most important part in the great developments in community health service which lie immediately before us. That this was the hope of Miss Elizabeth L. Smellie, who so ably guided the Order from 1924-40 and from 1944-47, was expressed in her last report as Chief Superintendent.

The public health nurse in the official agency which does not incorporate a bedside service very frequently envies her colleague in the V.O.N. who enters the home with a real and tangible service to offer and who builds on this the relationships for further health teaching. If there are any regrets about the book, it is that the real health education which is so much a part of the work of the Victorian Order nurse today is not sufficiently emphasized.

As a history of an institution which the Right Hon. W. L. Mackenzie King referred to as "one of the great National Orders of Canada", the book merits the attention of every public health nurse in Canada.

LYLE CREELMAN

How to Interpret Social Welfare. By Helen Cody Baker and Mary Swain Routzahn. New York: Russell Sage Foundation, 1947. 141 pages. \$2.50

AT FIRST glance the title may deter those who are interested not in social welfare exclusively but more particularly in the field of public health. Yet who can tell where, in the field of health education at any rate, social

welfare ends and public health begins.

The book's subtitle gives a better clue to its contents—"A Study in Public Relations". And the amazing thing is that in 141 pages the authors manage to give one as comprehensive a picture as can be found anywhere between two covers as thinly spaced.

After a chapter on the social agency and its "publics" (illustrated by diagram), the book is divided into four main sections. The first three are devoted to "telling your story" (a) by the spoken word—conversation, informal and formal meetings, radio; (b) by the written word—letters, bulletins, annual reports, newspapers; (c) in pictures—to audiences (displays and films) and to readers. Then there are chapters outlining resources for the interpreter and a suggested public relations program. A list of reading references, too, is quite valuable.

In dealing with each medium there are discussion suggestions which are thought-provoking to say the least, and the book is well illustrated throughout by half-tone and line cut.

Perhaps experienced health educators and others who have been "through the mill" may find this book mostly a repetition of things already learned—especially those who have had long background experience in newspaper work or journalism or public relations. But I venture to say that 99 out of 100 would find even those old lessons presented in a new and refreshing way. The book even tells one how to humanize statistics, how "to establish a mood", how to deal with your member of Parliament.

Certainly for those who haven't the breadth of experience of the highly trained health educator or public relations expert—those hundreds of professional and semi-professional workers and volunteers in public health work—those who must deal with newspapers and speak to audiences occasionally, write scripts, reports and campaign letters, prepare bulletins, speak on the radio—and the hundred and one other "public relations" chores, this book should be invaluable.

As the authors say: "Here are the tools and here are suggested ways of using them. With study and practice, may you use them well."

C. W. GILCHRIST

